2

Main catalogue part 2

Hospital engineering

Main catalogue part 2
Hospital engineering
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Further information on other product ranges :

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2.0

Th Power in

Bender – The company

Bender is an innovative, medium-sized company specialising in electrical safety and based in Grünberg in the German state of Hesse. Thanks to its entrepreneurial spirit, "can-do" attitude and collaborative management style, the company, which was founded in 1939 by Dipl.-Ing. Walther Bender, is now an international group with more than 400 employees.

Having constantly expanded its range of products in consultation with customers, Bender is now in a position to offer practical solutions for all areas of electrical safety.

Key focus areas include the development, production, distribution and servicing of insulation monitoring devices (A-ISOMETER®), residual current monitors, supply monitoring systems, test engineering equipment, alarm indicator and operator panels, as well as complete power supplies. These systems serve as an early warning system for detecting faults in electrical and electronic installations and are primarily used in applications where high levels of operational reliability and protection against fire and explosion are required. In this context, our internationally recognised quality management system and flexible corporate culture, which is based on the principle of cooperation, provide the basis for our high-quality products and services.

Bender – A worldwide presence

Bender has subsidiaries and representatives worldwide, who provide users on all continents with the support they need. Our experienced application engineers are there to offer you expert advice when it comes to selecting, configuring and using your systems.

Electrical Safety

Bender – Specialist for electrical safety in hospitals

In order for medical technical equipment to function, there has to be a reliable electricity supply. This, coupled with the fact that any power failure is likely to put people's lives at risk, imposes stringent requirements as regards the reliability of power supplies for medical locations. Back in the 1960s, when the very first independent hospital standards were introduced in Germany, Bender was one of the first companies to launch an electronic insulation monitoring device for unearthed power supply systems (IT systems) within medical locations. Today, the company offers a universal solution for reliable medical locations power supplies in the form of its MEDICS® universal changeover and monitoring system.

Bender – All-round service

The customer and the search for solutions to customer-specific requirements are at the heart of everything we do. Regardless of which phase you are at, whether it's planning, configuration, commissioning or actual operation, our specialists will be happy to help.

...There from the very start

1960

In 1962 the first independent VDE standard specifically relating to medical locations was published. The A-ISOMETER® 107TM2 was one of the world's first electronic insulation monitoring devices to ever be launched for use in medical locations.

A-ISOMETER® 107TM2 (1977)

Changeover and monitoring module UM (1994)

1980

In the light of new discoveries and to take account of internationally binding specifications, in June 1981, standard DIN VDE 0107: 1981-06 entitled "Erection and testing electrical installations in medical locations" came into force.

At this point, the A-ISOMETER® 107TM40 was introduced for the purpose of monitoring IT systems. In addition, series production of alarm indicator and operator panels for hospitals began, specifically those intended for use in operating theatres and on intensive care units.

A-ISOMETER® 107TM40 with Tableau (1982)

1990

Work continued on German standard DIN VDE 0107 to ensure that it remained in line with the current state of the art. A new edition was published in 1994. The key points covered by this standard were the requirements and use of standalone changeover equipment for redundant power supplies. The UM107ETU changeover and monitoring module was the first complete solution for Group 2 rooms to be made available on the market. In addition, the first alarm indicator and operator panels with plain-text display were launched.

2000

The proliferation of modern bus systems and the desire for more information culminated in the development of the MEDICS® system at the end of the 1990s. The buzzwords associated with this development were: increased reliability for power supplies in medical locations, data exchange via bus systems, display of information in plain-text format and user-friendliness. In November 2002 standard DIN VDE 0100-710 (VDE 0100-710): 2002-11 came into force, superseding DIN VDE 0107 (VDE 0107): 1994-10.

This national standard, which is based on international draft standard IEC 60364-7-710, takes account of the latest advances within the field of medical engineering and higher levels of safety awareness.
The MEDICS® system also meets these new requirements, thereby providing clear proof of Bender's forward-thinking strategy.

Modern changeover and monitoring module UFC107E

...and still here today

Changeover and monitoring module UMC107E

TM Operator panel

Alarm indicator and test combination MK2430

RCMS system

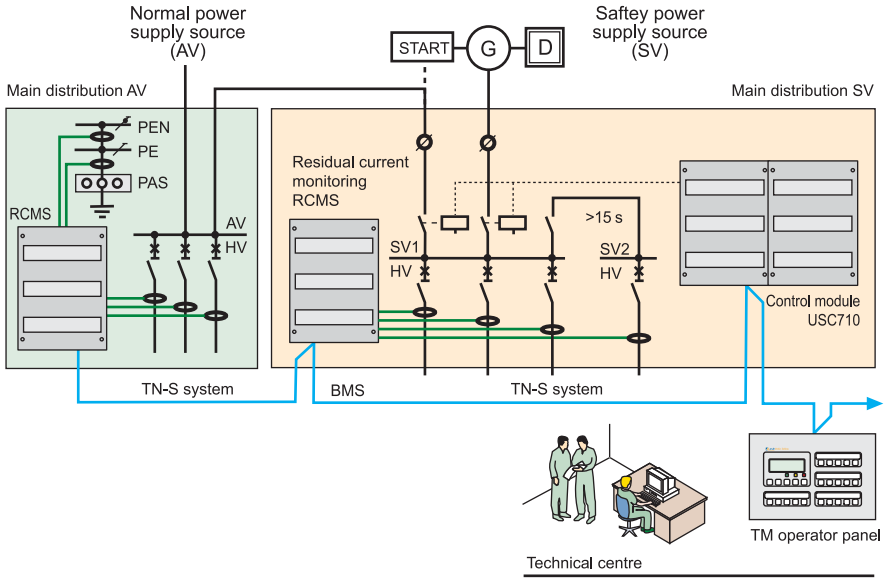
Voluntary testing by TÜV Süddeutschland

Device overview
Changeover and control modules for main distribution boards

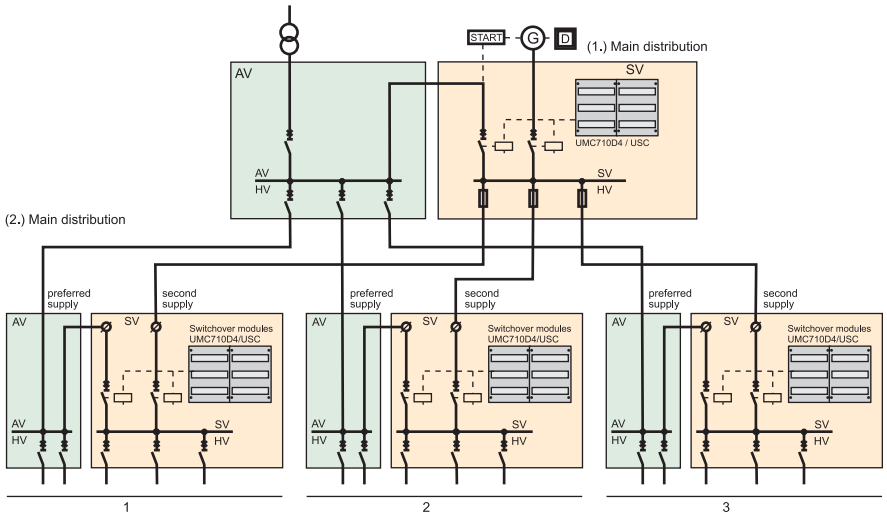
Solutions for the structure of power supplies in main distribution boards of the safety power supply source and upstream of main distribution boards.

Changeover and control modules for use in accordance with IEC 60364-7-710 para. 710.556 “Safety services” / DIN VDE 0100-710: 2002-11 para. 710.537.6.1 “Main distribution of the safety power supply source” and para. 710.537.6.2 “Main distribution boards”.

Examples of application



Changeover main distribution board



Power supply for several buildings from a central point (passive system)

Type

Function

- Control module for changeover and monitoring module
- Complete changeover and monitoring module
- Manual/automatic mode

Nominal voltage/nominal current

- Nominal voltage U_n/Nominal frequency f_n
- Rated operational current I_n

Functions in accordance with IEC 60364-7-710 / DIN VDE 0100-710

- Voltage monitoring line 1, line 2
  Output of the changeover and monitoring equipment
- Change-over 1/2
- Functional test with time monitoring
- Multiple interlocking of the switching elements
- Cables laid to resist short-circuits and earth faults
- Control circuit with single fault tolerance

Response values/contacts

- Undervoltage
- Change-over period, setting
- Response time t_{an}
- Response time t_{off} adjustable in 50 ms steps
- Return transfer time t_{on} adjustable in 1 s steps
- Pause time adjustable in 50 ms steps
- Common alarm

Switching elements

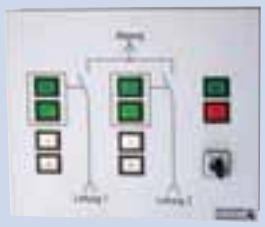
- Mechanically latched contactors
- Switch disconnector

Additional monitoring functions

- Switching state
- Wire break actuation devices and automatic processes
- Short-circuit upstream/downstream of the changeover module
- Auxiliary contacts of the switching elements

General features

- Manual/automatic TMX-HA operator panel
- Indication
- Interface/protocol
- Power supply for
- Terminals, control section
- Terminals, power supply section

	USC710D4-HA	UMC710D4	UMC710D4-HA	UMC108E	TMX-HA
					
	×	--		--	--
	--	×		×	--
	×	--	×	--	Operator panel
	load switch/circuit-breaker**	3NAC 400/230 V/50…60 Hz		AC 230 V/50…60 Hz	AC/DC 20 V
	see switching element	65…630 A (29…630 A)*		25…80 A	--
	×	×		×	indicator light
	load switch/circuit-breaker	×		×	indicator light
	×	×		×	--
	×	×		×	toggle switch
	on site	×		×	--
	×	×		×	×
	0.7…0.9 x U_n	0.7…0.9 x U_n		0.7…0.9 x U_n	--
	depending on the switching element	65…80 A (29…42 A)* t < 0.5…20 s 100…630 A t < 0.8…20 s		t < 0.5…20 s	--
	50…250 ms	50…250 ms		50…250 ms	--
	0…9950 ms	0…9950 ms		0…9950 ms	--
	0…249 s	0…249 s		0…249 s	--
	0…9950 ms	0…9950 ms		0…9950 ms	--
	changeover contact	changeover contact		changeover contact	--
	--	up to 42 A*		×	--
	--	63 A or higher		--	--
	×	×		×	×
	×	×		×	×
	×	×		×	×
	×	×		×	×
	possible	--	possible	--	×
	LC displays, backlit	LC displays, backlit		LC displays, backlit	indicator lights
	RS-485/BMS	RS-485/BMS		RS-485/BMS	--
	MK2430 / MK800 / TMX-HA	MK2430 / MK800 / TMX-HA		MK2430 / MK800 / TMX-HA	--
	cage clamp	cage clamp		cage clamp	plug-in terminal strip
	--	cage clamp/direct connection		cage clamp	--
	Chapter 2.1 – Page 26 - 29	Chapter 2.1 – Page 30 - 33		Chapter 2.1 – Page 34 - 35	Chapter 2.1 – Page 36 - 37

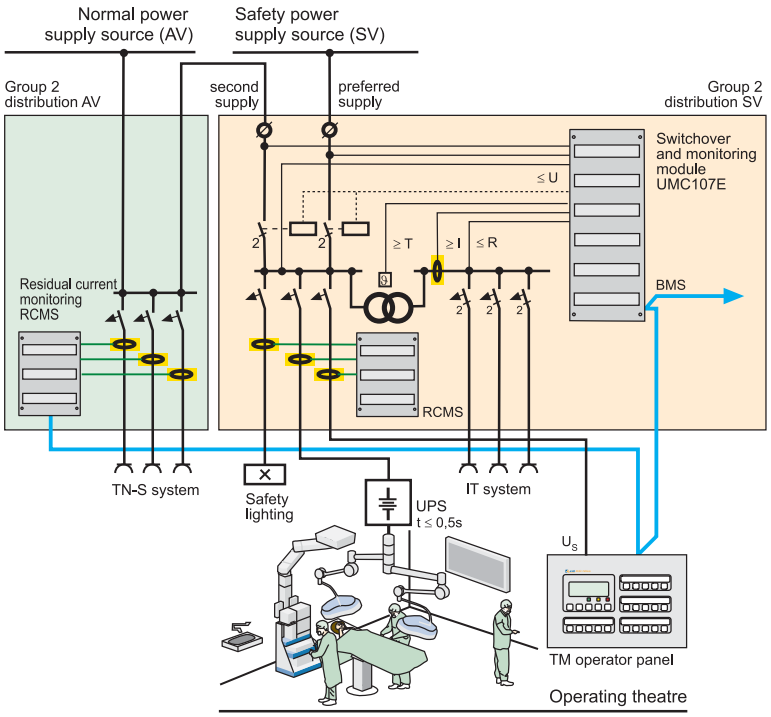
* Nominal current according to DIN VDE 0100-710: 2002-11 para. 710.537.6
** see table on page 27

Device overview
Changeover and monitoring modules for group 2 medical locations

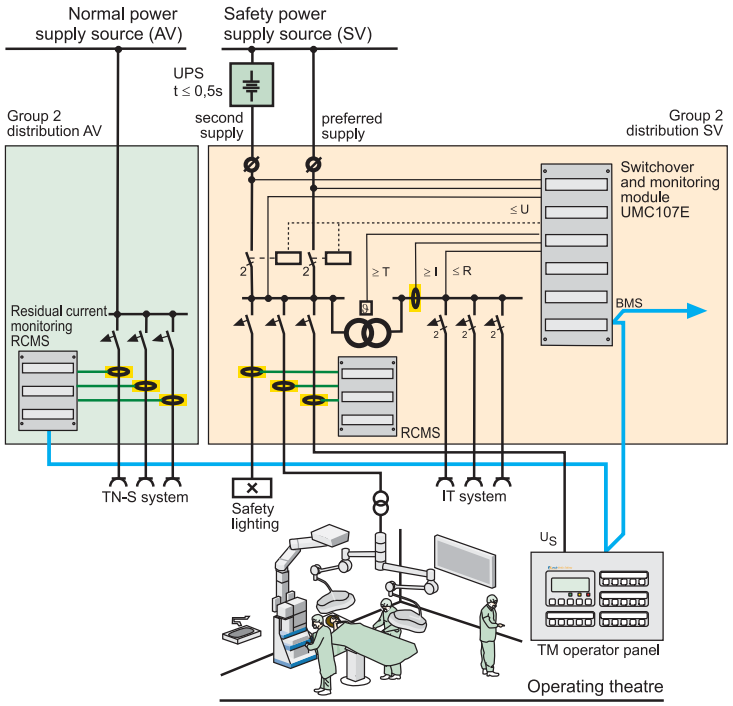
Solutions for the power supply of group 2 medical locations, e.g. operating theatre rooms, intensive care units

Changeover and monitoring modules for use in accordance with IEC 60364-7-710:2002-11 para. 710.556 “Safety services” / DIN VDE 0100-710: 2002-11 para. 710.537.6.2 “Distributon boards for the power supply of medical locations of group 2” and para. 710.512.1.6 “Medical IT systems for group 2 medical locations”.

Examples of application



SV/AV change-over with UMC107E



SV/UPS change-over with UMC107E

Type

Function
- Changeover module
- Insulation, load, temperature monitoring
- Insulation monitoring operating theatre light
- Insulation fault location system

Nominal voltage/nominal current
- Nominal voltage U_n/nominal current f_n
- Rated operational current I_n

Functions in accordance with IEC 60364-7-710 / DIN VDE 0100-710
- Voltage monitoring line 1, line 2, line 3 (downstream of the changeover module)
- Change-over line 1/2
- Functional test with time monitoring
- Multiple interlocking of the switching elements
- Cables laid to resist short-circuits and earth faults
- Control circuit with single fault tolerance
- Insulation monitoring
- Load current monitoring
- Temperature monitoring response value

Insulation fault location
- Number of circuits/2-pole circuit breakers

Response values/contacts
- Undervoltage
- Change-over period, setting
- Response time t_{an}
- Response time t_{off} adjustable in 50 ms steps
- Return transfer time t_{on} adjustable in 1 s steps
- Pause time adjustable in 50 ms steps
- Common alarm

Additional monitoring functions
- Switching state
- Wire break actuation devices and automatic processes
- Short-circuit upstream/downstream of the changeover equipment
- Auxiliary contacts of the switching elements
- Connection system / PE A-ISOMETER®

General features
- Indication
- Interface/protocol
- Power supply for
- Terminals, control section
- Terminals, power supply section

UFC107E-...	**UMC107E**	**LFC107E**	**LTIC107E**
×	×	--	--
×	×	×	×
--	--/×	--	--
×	--	×	--
AC 230 V/50…60 Hz	AC 230 V/50…60 Hz	AC 230 V/50…60 Hz	AC 230 V/50…60 Hz
65 A, 80 A (29 A, 42 A)*	65 A, 80 A (29 A, 42 A)*	--	--
×	×	--	--
×	×	--	--
×	×	--	--
×	×	--	--
×	×	×	×
×	×	×	×
50…500 kΩ	50…500 kΩ	50…500 kΩ	50…500 kΩ
5…50 A	5…50 A	5…50 A	5…50 A
4 kΩ	4 kΩ	4 kΩ	4 kΩ
6, 12, 18, 24/per circuit	--	6, 12, 18, 24/per circuit	--
0.7…0.9 x U_n	0.7…0.9 x U_n	--	--
t < 0.5…20 s	t < 0.5…20 s	--	--
50…250 ms	50…250 ms	--	--
0…9950 s	0…9950 s	--	--
0…249 s	0…249 s	--	--
0…9950 s	0…9950 s	--	--
2 changeover contacts	2 changeover contacts	Changeover contact	Changeover contact
×	×	--	--
×	×	--	--
×	×	--	--
×	×	--	--
×	×	×	×
LC displays, backlit	LC displays, backlit	LC display, backlit	LC display, backlit
RS-485/BMS	RS-485/BMS	RS-485/BMS	RS-485/BMS
MK2430 / MK800	MK2430 / MK800	MK2430 / MK800	MK2430 / MK800
cage clamp	cage clamp	cage clamp	cage clamp
cage clamp	cage clamp	--	--
Chapter 2.2 – Page 40 - 45	**Chapter 2.2 – Page 46 - 49**	**Chapter 2.2 – Page 50 - 53**	**Chapter 2.2 – Page 54 - 56**

* Nominal current according to DIN VDE 0100-710: 2002-11 para. 710.537.6

Device overview
Isolating transformers, transformers for operating theatre luminaires

Solutions for safe and secure power supply in medical locations, e.g. operating theatre rooms, intensive care units

Isolating transformers for the design of medical IT systems in accordance with DIN VDE 0100-710: 2002-11 para. 710.413.1.5 "IT systems" and para. 710.512.1.6.2 "Transformers for IT systems".

Type	ES710	DS0107	Operating theatre luminaires transformers ESL107
Application	Design of medical IT systems	Supply of three-phase loads in rooms of the groups 0/1/2	Supply of operating theatre luminaires
Type of distribution system			
	single-phase	three-phase	single-phase
Voltages			
Input	AC 230 V	3AC 400 V	AC 230 V (± 5 %, ± 10 %)
Output	AC 230 V	3NAC 230 V	AC 23…28 V
Frequency range	50…60 Hz	50…60 Hz	50…60 Hz
Rated power			
	--	2000 VA	120 VA
	3150 VA	3150 VA	160 VA
	4000 VA	4000 VA	280 VA
	5000 VA	5000 VA	400 VA
	6300 VA	6300 VA	630 VA
	8000 VA	8000 VA	1000 VA
	10000 VA	10000 VA	--
Type of construction			
vertical	×	×	×
horizontal	×	×	--
encapsulated (Class II)	×	×	--
	Chapter 2.3 – Page 60 - 63	Chapter 2.3 – Page 64 - 67	Chapter 2.3 – Page 68 - 69

Device overview
Alarm indicator and operator modules

Type	MK2430-11	MK2430-12	MK800-11	MK800-12	TM800
Messages / indications					
MEDICS® systems	×		×		×
Residual current monitoring system RCMS	×		×		×
Insulation fault location system EDS	×		×		×
Installation type					
Flush-mounting	×		×		×
Cavity mounting	×		×		×
Cable-duct mounting	×		×		--
Panel mounting	×		×		×
Inputs/outputs					
Digital inputs (potential free)	12	--	16	--	< 192
N/O or N/C operation	selectable	--	selectable	--	selectable
Relay outputs	1	--	1	--	< 192
N/O or N/C operation	configurable		configurable		N/C operation
Common alarm	configurable		configurable		configurable
System fault alarm	configurable		configurable		configurable
Display and operating elements					
LC display, backlit, screen resolution	4 x 20 characters		4 x 20 characters		4 x 20 characters
Character height	3.1 mm		8 mm		8 mm
LEDs: Normal, Warning, Alarm	×		×		×
"Buzzer mute" button	×		×		×
Button to display "Additional text"	×		×		×
Button parameter setting	3		3		3
Parameter setting/text message					
Several languages to choose from	20		20		20
Standard display	4 x 20 characters		4 x 20 characters		4 x 20 characters
Additional text can be displayed	3 x 20 characters		3 x 20 characters		3 x 20 characters
Pre-defined standard texts	×		×		--
Freely configurable text messages	200		1000		1000
History memory max. data records	250		1000		1000
Real-time clock	×		×		×
Parameterization software	MK-Set V 2.xx (USB, BMS)		TMK-Set V 3.xx (USB, BMS)		TMK-Set V 3.xx (USB)
Messages/Alarm medical gases	acc. to EN475, EN737-3		acc. to EN475, EN737-3		acc. to EN475, EN737-3
Interfaces					
RS-485 (BMS protocol)	1		2		2
BMS address range	1…150		internal: 1(…150), external: 1…99		internal: 1(…150), external: 1…99
Master redundancy BMS internal	×		×		×
Master redundancy BMS external	--		×		×
USB	×		×		×
Voltage supply					
Supply voltage	AC/DC 24 V		AC/DC 24 V		AC/DC 24 V
Stored energy time in the event of power failure	≤ 15 s		≤ 2 s		≤ 2 s
	Chapter 2.4.1 – Page 72 - 77		Chapter 2.4.1 – Page 78 - 84		Chapter 2.4.2 – Page 86 - 99

Device overview
Signal converters

Type	**SMI472-12**	**SM0480-12**	**SM0481**	**SM0482P-12**
Application	Conversion of digital inputs to BMS protocol	Conversion of BMS protocol to relay contacts	Conversion of BMS protocol (swit-ching commands) to relay contacts	Conversion of BMS protocol to relay contacts
Inputs				
Interface/protocol	--	RS-485/BMS	RS-485/BMS	RS-485/BMS
Digital inputs	8/4 (configurable)	--	--	--
Alarm/operating messages				
Outputs				
Interface/ protocol	RS-485/BMS	--	--	--
Relay contacts	--	12 N/O contacts	12 N/O contacts	12 N/O contacts
Operating principle	--	N/O operation	N/C or N/O operation	N/C or N/O operation
Device features				
Supply voltage	AC 230 V/DC 220 V	AC 230 V	AC 230 V	AC 230 V
Common alarm contact	1 changeover contact	--	--	--
Galvanic separation	--	×	×	×
	Chapter 2.5.1 – Page 102 - 103	**Chapter 2.5.1 – Page 104 - 105**	**Chapter 2.5.1 – Page 106 - 107**	**Chapter 2.5.1 – Page 108 - 108**

Device overview
Protocol converters for BMS, standard fieldbus systems and Ethernet networks

Type	FTC470XET	FTC470XMB	FTC470XDP	DI400
Functions				
Protocol input	BMS	BMS	BMS	BMS
Protocol output	Ethernet (TCP/IP) OPC	Modbus RTU	PROFIBUS DP	BMS
Alarm messages	×	×	×	×
Measured values	×	×	×	×
Device parameter setting	via PC with browser	to a limited extent (via visualization)	to a limited extent (via visualization)	via TKM-SET
Alarm list	via visualization	via visualization	via visualization	via visualization*
History memory	via PC with browser	via visualization	via visualization	via PC
Diagrams	via visualization	via visualization	via visualization	via visualization*
E-Mail notification	via PC with browser	to a limited extent (via visualization)	to a limited extent (via visualization)	to a limited extent (via visualization)
Device test	via PC with browser	to a limited extent (via visualization)	to a limited extent (via visualization)	to a limited extent (via visualization)
Data logger	via PC with browser	to a limited extent (via visualization)	to a limited extent (via visualization)	to a limited extent (via visualization)
Axeda compatible	×	×	×	×*
Advantech comptatible	×	×	×	×*
Active X Toolkit compatible	×	--	--	--
Client communication	Ethernet	Modbus RTU	PROFIBUS DP	Ethernet*
Connection				
BMS	screw-type terminal	screw-type terminal	screw-type terminal	screw-type terminal
Output	RJ45	9-pin SUB-D	9-pin SUB-D	screw-type terminal / RJ45*
System requirements				
Computer	Standard PC	--	--	Standard PC
Operating system	Windows, Linux, …	--	--	Windows
Browser	Internet Explorer, Opera, Firefox etc.	--	--	--
	Chapter 2.5.2 – Page 112 - 113	Chapter 2.5.2 – Page 114 - 115	Chapter 2.5.2 – Page 116 - 117	Chapter 2.5.2 – Page 118 - 119

Visualization = SCADA software with appropriate programming

* Ethernet option (available from 2008)

Device overview
Interface converters and repeaters

Type	**DI-1PSM**	**DI-2**	**DI-2USB**
Application	Interface repeater	Interface converter	Interface converter
Inputs/outputs			
Input	RS-485	RS-485	RS-485
Connection	screw-type terminal	screw-type terminal	screw-type terminal
Cable length	≤ 1200 m	≤ 1200 m	≤ 1200 m
Outputs			
Connection	RS-485	RS-232	USB
Output	screw-type terminal	9-pin SUB-D	USB Type B
Cable length	≤ 1200 m	≤ 15 m	≤ 5 m
Additional bus devices	≤ 30	--	--
Supply voltage			
Supply voltage	AC/DC 24 V ± 20 %	DC 10…30 V	by USB port with driver CD
General features			
Mounting	DIN rail mounting	screw mounting or DIN rail mounting	--
	Kapitel 2.5.3 – Seite 120 - 121	Kapitel 2.5.3 – Seite 122	Kapitel 2.5.3 – Seite 123

Device overview
Software

Type	Axceda Wizcon	BMS OPC server
Application	SCADA visualization software	Interface converter
Appropriate gateway	FTC470XET, FTC470XMB or BMS OPC server	DI-2 RS-485 RS-232 or USB interface
Technical requirements	Compatible PC ≤ 1 Ghz, ≤ 256 MB RAM 500 MB storage space on the hard disc CD ROM or DVD drive Graphics card ≤ 8 MB Screen resolution ≤ 800 x 600 USB or dongle printer connection	128 MB RAM 10 MB of free hard disk space CD ROM drive
Operating systems	Windows 2000, XP	Windows 2000, XP
Scope of delivery	Demo version, development or runtime versions for 100…65000 process items Operating manual	BMS-OPC server Softing Demo Client User manual, configuration example
Note	Customer-specific programming offered as service	Customer-specific programming offered as service
	Chapter 2.5.4 – Page 128 - 129	Chapter 2.5.4 – Page 130 - 131

Device overview
Power supply units, mounting kits

Type	AN450
Function	
Power supply unit AC	×
Power supply unit DC	--
Voltages	
Input voltage	AC 230 V 50…60 Hz
Output voltage	AC 20 V
Rated output	9 VA
Overload protection primary circuit	--
Overload protection secondary circuit	PTC resistor
Electrical separation	×
Application	
Supply MK2430… / MK800	max. 3 / 2
Supply TMX-HA	×
Supply DI-1, DI-2	--

Chapter 2.5.5 – Page 134 - 135

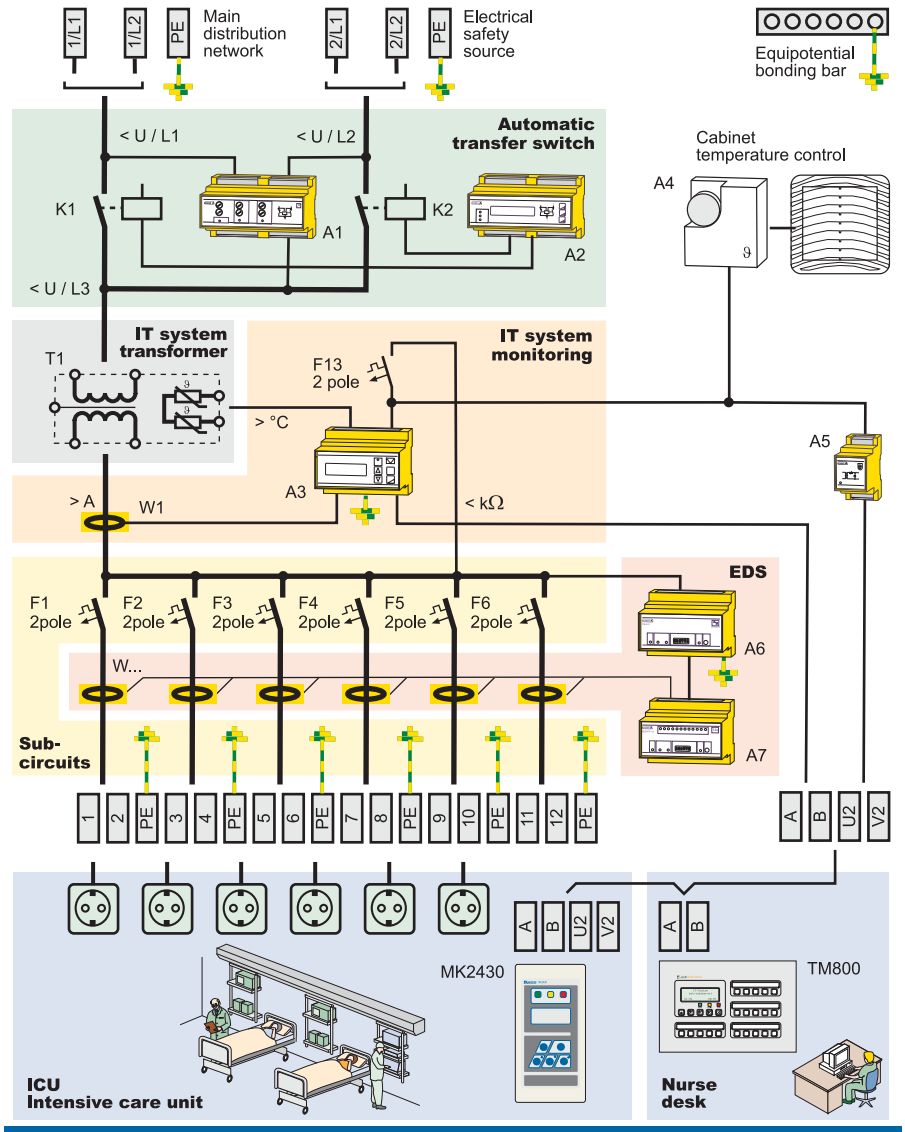
Type	XM420
Function	Mounting frame
For device family	
RCM, RCMA, RCMS	RCM420, RCMA420
Dimensions	
External dimensions	--
Technical data	
Input	--
Scale	--
Centre scale mark	--
Display range	--
Enclosure	
XM420	×
XM460	--
X470/X475	--

Chapter 2.5.5 – Page 136

Device overview
Insulation monitoring devices

Type	IR420-D6	IR426-D47
Function: insulation monitoring for	de-energized AC, DC, 3(N)AC loads	Main OP light circuits
Fields of application		
Nominal voltage range U_n	AC 0…480 V	AC/DC 132 V
Type of distribution system	DC, AC, 3(N)AC TN, TT, IT systems	IT systems
Frequency range f_n	AC 42…460 Hz	DC, 42…62 Hz
System leakage capacitance C_e	< 10 µF	< 20 µF
Nominal voltage range U_n can be extended	≤ 7.2 kV (AGH520)	--
Response values/contacts		
Number of response values	2	2
Response value, insulation monitoring	100 kΩ…10 MΩ	10 kΩ…200 kΩ
Contact alarm	1 changeover contact	1 changeover contact
Contact prewarning	1 changeover contact	1 changeover contact
Communication		
Measured value display	LC display	LCD
Prewarning indication	×	×
Interface/protocol	--	--
General features		
Supply voltage	see ordering onformation	see ordering information
Measuring principle	DC	AMP
Test and reset button	internal / external	internal / external
Fault memory	measured value memory	×
Selective detection of the point of fault L+ / L-	×	--
Connection monitoring	--	--
	Chapter 2.6 – Page 138 - 141	Chapter 2.6 – Page 142 - 146

Device overview
Floor-standing distribution cabinets and wall mounted distribution boards for IT systems



Type

Function
- IT system transformer
- Changeover and monitoring module
- Insulation, load and temperature monitoring
- Insulation fault location system
- Circuit breakers for sub-circuits

Nominal voltage/nominal current
- Nominal voltage U_n
- Rated operational current I_n

Functions in accordance with IEC 60364-7-710 / DIN VDE 0100-710
- Voltage monitoring line 1, line 2, line 3 (downstream of the changeover equipment)
- Change-over line 1/2
- Functional test with time monitoring
- Multiple interlocking of the switching elements
- Cables laid to resist short-circuits and earth faults
- Control circuit with single fault tolerance
- Insulation monitoring
- Load current monitoring
- Temperature monitoring response value PTC

Outgoing circuits
- Number of outgoing circuits
- 2-pole circuit breaker

Response values/contacts
- Undervoltage
- Change-over period, adjustable
- Response time t_{an}, adjustable
- Response time t_{off}, adjustable
- Response time t_{on}, adjustable
- Pause time, adjustable

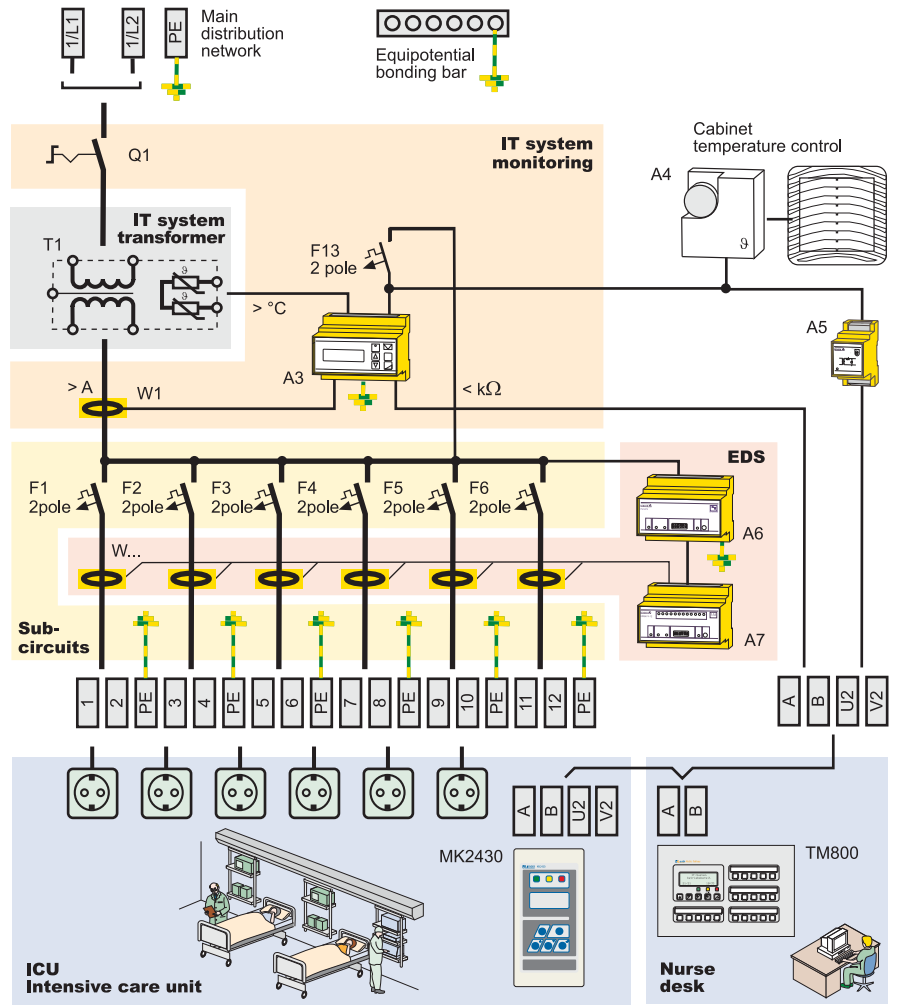
Additional monitoring functions
- Switching state
- Wire break actuation devices and automatic processes
- Short-circuit upstream/downstream of the changeover equipment
- Auxiliary contacts of the switching elements
- Connection system/PE A-ISOMETER®

General features
- Distribution cabinet (B x H x T)
- Terminal compartment
- Degree of protection
- Interface/protocol
- Ventilation
- Paint finish

TR-VITCF	**TR-VITC**
×	×
×	×
×	×
×	--
×	×
AC 230 V 50…60 Hz	AC 230 V 50…60 Hz
65 A/80 A (29 A/42 A)*	65 A/80 A (29 A/42 A)*
×	×
×	×
×	×
×	×
×	×
×	×
50…500 kΩ	50…500 kΩ
5…50 A	5…50 A
4 kΩ (ca. 120 °C)	4 kΩ (ca. 120 °C)
6	12
B16 for each outgoing circuit	B16 for each outgoing circuit
0.7…0.9 x U_n	0.7…0.9 x U_n
< 0.5…20 s	< 0.5…20 s
50…250 ms	50…250 ms
0…9950 ms	0…9950 ms
0…249 ms	0…249 ms
0…9950 ms	0…9950 ms
×	×
×	×
×	×
×	×
×	×
624 x 2013 x 425	374 x 2013 x 425
on top	on top
IP42	IP42
RS-485/BMS	RS-485/BMS
on the front panel	on the front panel
RAL 7035	RAL 7035
Chapter 2.7 – Page 148 - 151	**Chapter 2.8 – Page 152 - 155**

* Nominal current according to DIN VDE 0100-710: 2002-11 para. 710.537.6

2.0



Type

Function

- IT system transformer
- Changeover and monitoring module
- Insulation, load and temperature monitoring
- Insulation fault location system
- Circuit breakers for sub-circuits
- Number of IT systems

Nominal voltage/nominal current

- Nominal voltage U_n

Functions in accordance with IEC 60364-7-710 / DIN VDE 0100-710

- Insulation monitoring
- Load current monitoring
- Temperature monitoring response value PTC

Outgoing circuits

- Number of outgoing circuits
- 2-pole circuit breaker

Additional monitoring functions

- Connection system/PE A-ISOMETER®

General features

- Terminal compartment
- Degree of protection
- Interface/protocol
- Ventilation
- Paint finish

…-IPS-F	**…-IPS-F/EDS**	**…-IPS-W**	**…-IPS-W/EDS**
×	×	--	--
--	--	--	--
×	×	×	×
--	×	--	×
×	×	×	×
1…4	1…4	1…3	1…3
AC 230 V 50…60 Hz	AC 230 V 50…60 Hz	AC 230 V 50…60 Hz	AC 230 V 50…60 Hz
50…500 kΩ	50…500 kΩ	50…500 kΩ	50…500 kΩ
5…50 A	5…50 A	5…50 A	5…50 A
4 kΩ (ca. 120 °C)	4 kΩ (ca. 120 °C)	4 kΩ (ca. 120 °C)	4 kΩ (ca. 120 °C)
6…18	6…12	6…12	6…12
B16A*	B16A*	B16A*	B16A*
×	×	×	×
on top	on top	on top	on top
max IP54	max IP54	IP43/31	IP43/31
RS-485/BMS	RS-485/BMS	RS-485/BMS	RS-485/BMS
on the front panel	on the front panel	on the front panel	on the front panel
RAL 7035	RAL 7035	RAL 9016	RAL 9016
Chapter 2.7 – Page 156 - 161	**Chapter 2.7 – Page 162 - 167**	**Chapter 2.8 – Page 168 - 173**	**Chapter 2.8 – Page 174 - 179**

* optional B6A, B10A

Control modules for supply transfer systems with load switches / circuit breakers in main distribution boards

Chapter 2.1

Solutions for the structure of power supplies in safety power supply main distribution boards and upstream main distribution boards.

Changeover and control module for use in accordance with DIN VDE 0100-710: 2002-11 para. 710.537.6.1 “Main distribution of the safety power supply source” and para. 710.537.6.2 “Main distribution boards”.

Control module USC710D4-...-HA

Control module with single fault tolerance for load switches or circuit breakers

USC710D4-01-HA – Typical module

Device features

- Complete solution for changeover modules with integrated load switch or circuit breaker (3-pole or 4-pole) of different manufacturers
- Bus technology for easy installation and reduced fire load
- Clear menu structure with LC display allows easy parameter setting
- Internal functional testing including checking the operating times
- Variable changeover period t < 0.3…20 s + operating time of the switching element
- Automatic interlocking funktion (optional)
- Suitable for all common DIN rail systems
- Screwless-type connection technique
- HA version for manual/automatic control
- Additional alarm contacts (optional)
- Power supply for MK2430/MK800
- Special version available for use with generators
- Voluntary testing of the control module by TÜV Süddeutschland

Product description

The factory-made control modules of the USC710D4-HA series are designed to control changeover and monitoring modules with load switches or circuit breakers. Load switches and circuit breakers are used as switching elements. In conjunction with the TMX-HA operator panel, also manual control of the changeover module is possible, e.g. for servicing purposes. Information exchange between the changeover modules and the alarm and operator units is established via bus technology. The module is suitable for mounting onto all common DIN rail systems (equipment racks have to be provided).

Functions in accordance with IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)

- Voltage monitoring with control function
  - on the preferred supply (Line 1)
  - on the second supply (Line 2)
  - at the output of the changeover module (Line 3)
- Variable changeover period t < 0.3…20 s + operating time of the switching element
- Protection against wrong operation by multiple interlocking
- Control circuit with single fault tolerance
- Automatic return on recovery of the voltage
- Functional testing including checking of the operating times
- N conductor monitoring option

Further measures to increase the electrical safety

- Continuous monitoring of the actuation devices and automatic processes (coil, control contacts, connections).
- Monitoring for short-circuits at the output of the changeover device with pre-defined switching behaviour.

Single fault tolerance

The Control modules continuously monitors the functions and in this way ensures that an individual, foreseeable error cannot lead to a failure of the power supply at the output of the automatic changeover and monitoring module. (DIN VDE 0100-710: 2002-11 para. 710.521.6 control circuits).

Function

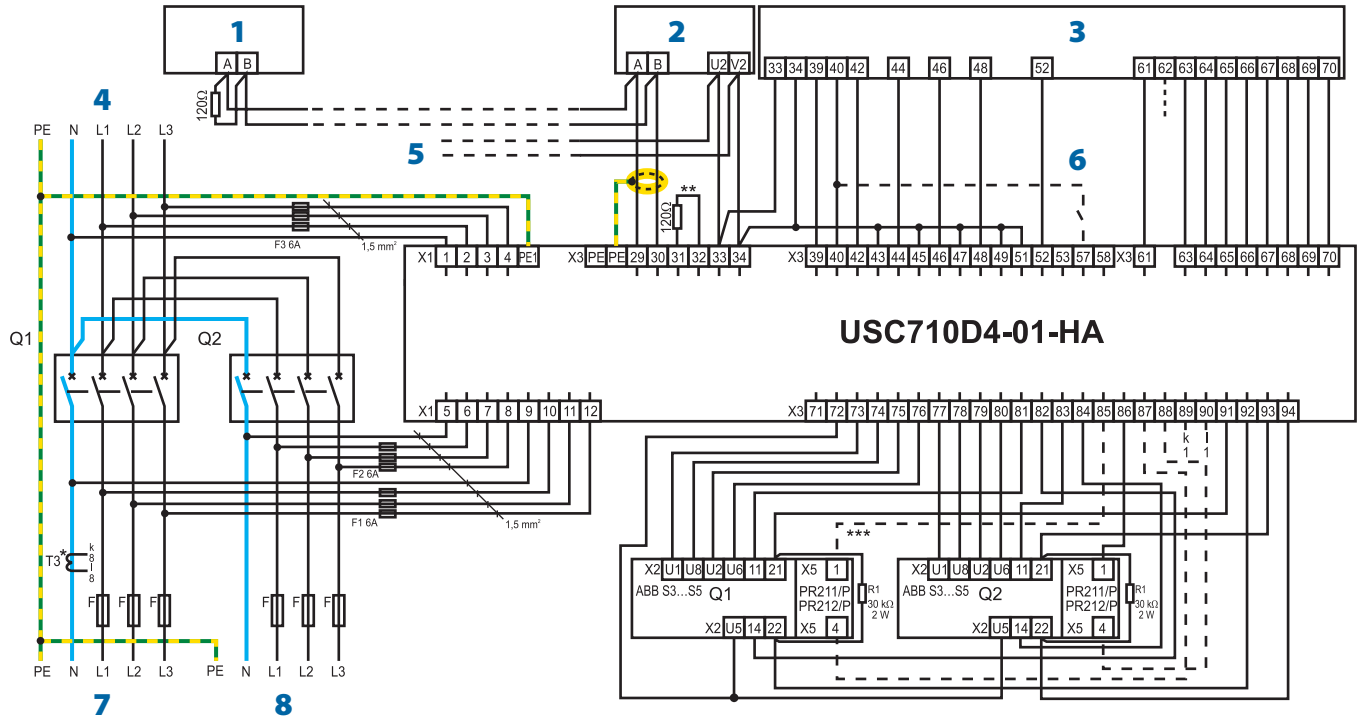
In fault-free condition, the preferred supply line is switched on. If the voltage drops in one or several line conductors below the set response value, changeover to the second supply will automatically take place. The changeover period can be set individually. In order to ensure operational readiness, the second line as well as the output of the changeover module (Line 3) are monitored too. On recovery of the voltage, return to the preferred supply line occurs automatically. Owing to variable delay times (return transfer time or pause time), the USC meets the individual installation-specific requirements (e.g. coordination of several changeover modules, reduction of switching energy). Via the menu, the function of the changeover module can be tested.

When the safety power supply source is supplied by a generator, the control module must provide a start-up signal in case of failure of the preferred supply. These versions provide an input for generator test functions.

Indications/messages

- Plain text messages display for all essential operating, fault and alarm messages
- Information exchange between alarm indicator and operator units via BMS bus
- Common alarm contact with protective separation in accordance with EN 50178
- Alarm contacts for failure/operation of line 1, line 2, switching state of the switching elements

Wiring diagram USC710D4-01-HA with TMX-HA



1 - Other alarm, measuring or monitoring devices
2 - Alarm indicator and test combination MK2430-12
3 - Manual/automatic TMX-HA operator panel
4 - Distribution 3 AC 400 V/N/PE 50 Hz
5 - Other MK…
6 - Automatic interlocking function
7 - Preferred supply 3 AC 400 V/N/PE 50 Hz
8 - Second supply 3 AC 400 V/N/PE 50 Hz

* T3 is not required for 3-pole circuit breakers and 4-pole changeover modules without N conductor monitoring. In this case, the function of the N conductor monitoring has to be deactivated in the “Setup” menu of the PRC487. T3 is not included in the scope of delivery of USC710D4-HA.

** Remove the terminating resistor, if additional bus devices are connected here.

*** In circumstances where changeover is not required in case of tripping of the circuit-breaker, the terminals X3: 85…88 have to be wired. Otherwise, the free connections (X3: 85 und 87 oder X3: 86 and 88) can be used to activate the automatic interlocking function by means of a switch.

Ordering information

Type	U_n	Control current for circuit breakers	Operating current	Special features for motor drive	Power consumption max.	Art. No.
USC710D4-01-HA	3(N) AC 400 / 230 V	< 5 A	< 5 A		21 W*	B 9205 7101
USC710D4-02-HA	3(N) AC 400 / 230 V	< 2 A	< 2 A		15 W*	B 9205 7102
USC710D4-03-HA	3(N) AC 400 / 230 V	< 5 A	< 5 A	for generator operator	21 W*	B 9205 7103
USC710D4-04-HA	3(N) AC 400 / 230 V	< 2 A	< 2 A	for generator operator	15 W*	B 9205 7104
USC710D4-05-HA	3(N) AC 400 / 230 V	< 16 A	< 16 A	control voltage 60 V	21 W*	B 9205 7105
USC710D4-06-HA	3(N) AC 400 / 230 V	< 2 A	< 5 A		15 W*	B 9205 7106
USC710D4-08-HA	3(N) AC 400 / 230 V	< 2 A	< 5 A	open-circuit monitoring 24 V	15 W*	B 9205 7108

* plus power dissipation of the circuit-breaker

2.1

Accessories

Type	U_n	Function	Art. No.
URC-11	AC 24 V	Relay module for alarm contact extension (option)	B 9205 7120
URC-14	AC 230 V	Relay module for alarm contact extension (option)	B 9205 7121
W1-S35		Measuring current transformer for N conductor monitoring	B 911 731
W2-S70		Measuring current transformer for N conductor monitoring	B 911 732
W35		Measuring current transformer for N conductor monitoring	B 9808 0010
W60		Measuring current transformer for N conductor monitoring	B 9808 0018

Dimension and weights

Type	Dimensions fields/rows (W/H/D mm)	Weight
USC710D4-01-HA	2/3 (500/450/130)	7.5 kg
USC710D4-02-HA	2/3 (500/450/130)	7 kg
USC710D4-03-HA	2/4 (500/600/130)	8.5 kg
USC710D4-04-HA	2/3 (500/450/130)	8 kg

Technical data control module USC710D4-…-HA

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 400 V
Rated impulse voltage/pollution degree	4 kV/3

Power unit/ switching elements

Switching elements	see manufacturer's information

Voltage ranges – Supply voltage devices

Supply voltage U_S	AC 230 V
Operating range of U_S	0.8…1.15 x U_S
Frequency range of U_S	50…60 Hz
Power consumption (without circuit-breaker)	see ordering information

Control and indicating device PRC487

Display, characters	LCD, illuminated, 2 x 16 characters
Control inputs	≤ DC 5 V

Voltage monitoring

Rated operational voltage U_e	3/N AC 400/230 V
Operating range U_e	0.7…1.3 x U_e
Frequency f_e	50…60 Hz
Response value undervoltage, adjustable	0.7…0.9 x U_e
Response value overvoltage	1.15 x U_e
Response time t_{an}	50…250 ms
Response time t_{off} adjustable (50 ms steps)	0…9950 ms
Return transfer time t_{on} adjustable (1 s steps)	0…249 s
Pause time, adjustable (50 ms steps)	0…9950 ms

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	2…90
Factory setting, device address	4

Switching elements (alarm contacts)

Number of changeover contacts	1 changeover contact
Operating principle	N/C operation

Contact data acc. to IEC 60947-5-1

Rated operational voltage U_e	AC 230 V / DC 220 V
Rated operational current I_e	AC 5 A / DC 0.2 A
Utilization category	AC 14/DC 12
Electrical service life, number of cycles	10.000
Minimum contact load	1 mA at AC / DC > 10 V

Terminals

Control unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/AWG 28-12
Stripping length	8…9 mm

Voltage monitoring unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.2…16 mm²/AWG 24-6
Stripping length	16…17 mm

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Storage	1K4
Operating temperature	-10 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M1
Long-time storage	1M3
Operating mode	continuous operation
Mounting position	vertical
Degree of protection, internal components (IEC 60529)	IP30
Degree of protection, terminals (IEC 60529)	IP20
Mounting into standard distribution panels	see table “Dimensions and weights”
Flammability class	UL94V-0
Product standards	IEC 60364-7-710 / DIN VDE 0100-700 (VDE 0100-710)
Operating manual	TGH1390
Weight	table “Dimensions and weights”

Control module/switching elements assignment

Manufacturer	Type	Nominal current	USC710D4…						
			-01-HA	-02-HA	-03-HA	-04-HA	-05-HA	-06-HA	-08-HA
ABB	ISOmax S1, S2	125…160 A	X		X		X		
ABB	ISOmax S3 to S5	160…630 A	X		X				
ABB	ISOmax S6, S7	400…1600 A	X		X		X		
ABB	Tmax T1 to T3	160…250 A							X
ABB	Tmax T4, T5	250…630 A		X		X	X		
ABB	Emax E1 to E6	800…3200 A			X		X	X	
ABB	Megamax F1 to F6	1250…6300 A			X			X	
ABB	Novomax G 30	800…1600		X		X			
GE AEG	Record Plus FG	400…630 A			X			X	
GE AEG	Record Plus FK	800…1600 A			X			X	
GE AEG	Spectra E160…250	160…250 A	X		X				
GE AEG	Spectra MC168, MC258	160…250 A	X		X				
GE AEG	Spectra ME07	630…6400 A			X		X	X	
GE AEG	M-PACT	400…4000 A			X			X	
GE AEG	Tele MP	63 A		X		X			
Merlin Gerin	NS100…630N	100…630 A	X		X				
Merlin Gerin	NS630B…1600B	630…1600 A		X		X			
Merlin Gerin	Masterpack NT630…1600	630…1600 A		X		X	X		
Merlin Gerin	Masterpack NW800…6300	800…6300 A		X		X	X		
Mitsubischi	NF	400…800 A							X
Moeller	NZM2…4	100…1600 A		X		X	X		
Moeller	NZM7 to NZM14	100…1250 A		X		X	X		
Moeller	IZM	630…6300 A		X		X	X		
OEZ	BD	250 A		X		X			
OEZ	BH	630 A		X		X			
Siemens	Sentron 3VL	160…800 A	X		X		X		
Siemens	Sentron	1250…1600 A	X		X		X		
Siemens	Sentron 3VF3 to 3VF6	80…630 A		X		X	X		
Siemens	Sentron 3VF7 to 3VF8	800…1600 A	X		X		X		
Siemens	Sentron 3WL	630…6300 A		X		X	X		
Siemens	Sentron 3WN6	630…3200 A		X		X	X		
Weber	BS	50…250 A		X		X			
Weber	BS	400 A		X		X			
Weber	BS	630…1600 A		X		X			

Changeover and monitoring module UMC710D4 – UMC710D4-HA UMC710D4-E1

Changeover and monitoring module with contactors/ switch disconnectors for 3(N)AC systems

UMC710D4 – Typical example

Device features

- Complete solution for a 4-pole changeover between two power supply sources
- Factory-made, tested module for time and cost-saving installation
- Nominal current I_n 29…630 A (versions with I_n 29…42 A, preferably used for group 2 distribution boards)
- Variable changeover period t < 0.5 s (< 0.8 s I_n >100 A)…20 s
- Connection monitoring
- Internal functional testing
- Clear menu structure with LC display allows easy parameter setting
- Bus technology for easy installation and reduced fire load
- Power supply for MK2430/MK800
- Screwless-type connection technique
- Halogen free cables
- Suitable for all common DIN rail systems
- HA version for manual/automatic control
- Voluntary testing by TÜV Süddeutschland

Product description

The factory-made modules of the UMC710D4 series are designed to change over between two power supply sources (AV/SV resp. SV/UPS). They are available for currents up to 630 A. For higher currents, the control module USC107D4 with external power unit can be used. Status indication and alarm texts on the alarm indicator and operator units takes place via bus technology. The modules are suitable for mounting onto all common DIN rail systems (equipment racks have to be provided by the customer).

Manual/automatic version

The manual/automatic version (HA) in conjunction with the control module TMX-HA-710 allows manual control of the changeover module, e.g. for servicing purposes.

Version E1 with integrated IT system monitoring

Version UMC710D4-E1 is equipped with an integrated IT system monitoring suitable for operation with single-phase isolating transformers of the ES710 series. Two phase conductors are provided for the connection of additonal loads (e.g. lighting).

Functions in accordance with IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)

- Voltage monitoring with control function
  - on the preferred supply (Line 1)
  - on the second supply (Line 2)
  - at the output of the changeover module (Line 3)
- Variable changeover period t ≤ 0.5…20 s
- Protection against wrong operation by multiple interlocking
- Cables laid to resist short-circuits and earth faults
- Control circuit with single fault tolerance
- Automatic return on recovery of the voltage
- Functional testing including checking of the operating times

Further measures to increase the electrical safety

- Continuous monitoring of the actuation devices and automatic processes (coil, control contacts, connections).

Monitoring for short-circuits upstream and at the output of the changeover device and the pre-defined switching behaviour.

Single fault tolerance

The changeover modules continuously monitor the functions and in this way ensure that an individual, foreseeable error cannot lead to a failure of the power supply at the output of the automatic changeover and monitoring module. (DIN VDE 0100-710: 2002-11 para. 710.521.6 control circuits).

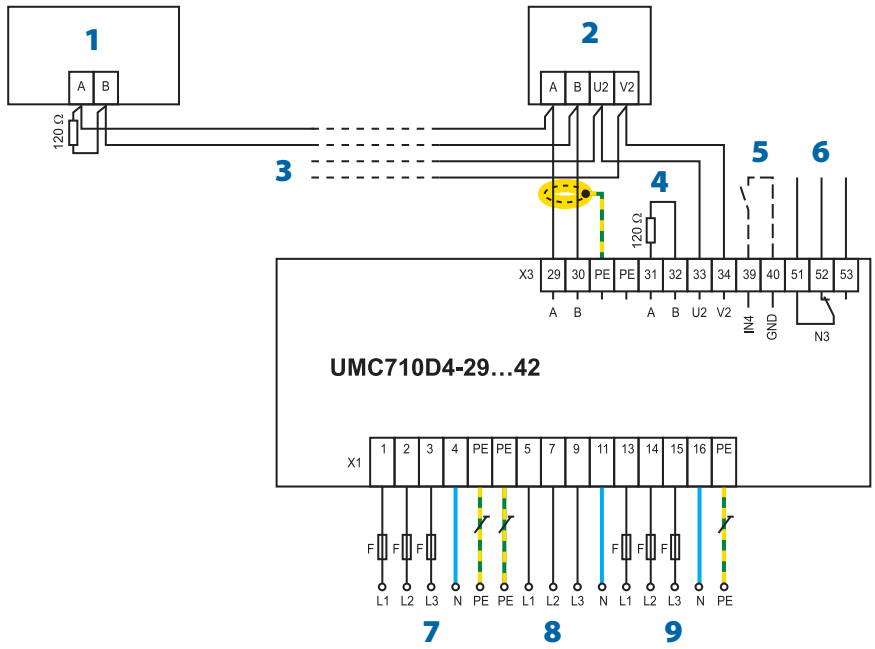
Function

In fault-free condition, the preferred supply line is switched on. If the voltage drops in one or several line conductors below the set response value, changeover to the second supply will automatically take place. The changeover period can be set individually. In order to ensure operational readiness, the second line as well as the output of the changeover equipment (Line 3) are monitored too. On voltage recovery, return to the preferred supply line occurs automatically. Owing to variable delay times (return transfer time or pause time), the UMC meets the individual installation-specific requirements (e.g. coordination of several changeover modules, reduction of switching energy). The function of the changeover equipment can be tested via the test button.

Indications/messages

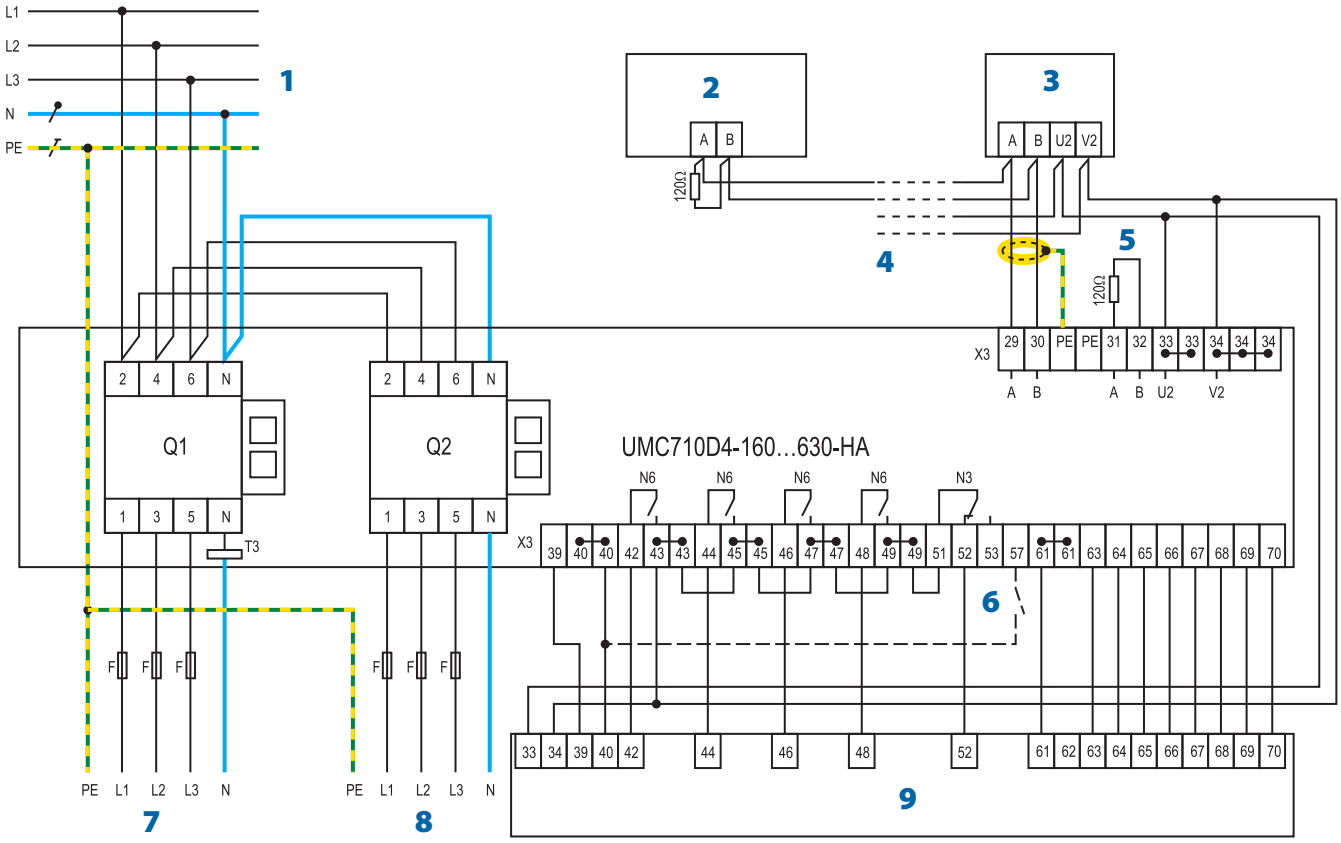
- Text display of all major operating, fault and alarm messages
- Information exchange between alarm indicator and operator units via BMS bus
- Common alarm contact with protective separation in accordance with EN 50178

Wiring diagram UMC710D4



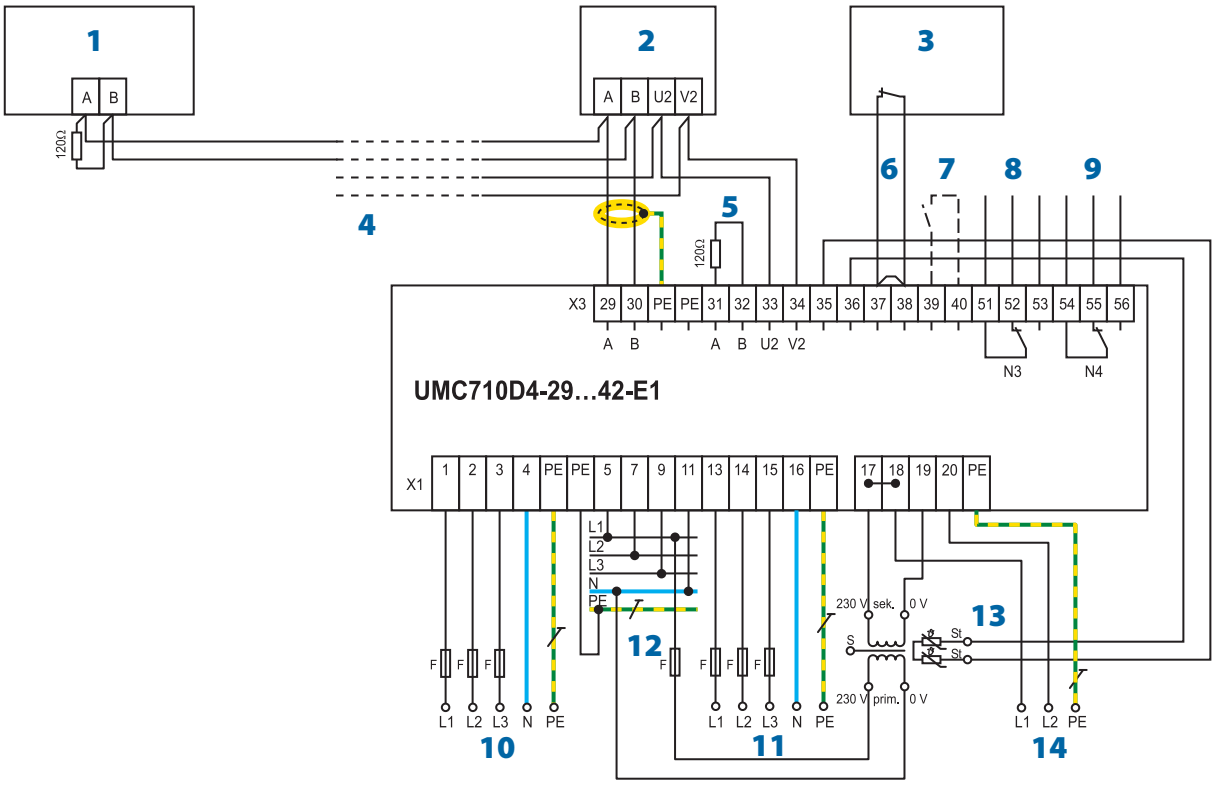
1 - Other devices connected to the BMS bus
2 - Remote alarm indicator and test combination MK24…
3 - Other MK24…
4 - Remove the terminating resistor, if additional bus devices are connected here.
5 - Manual/automatic control
6 - Common alarm control and indicating device PRC487
7 - Preferred supply (Line 1) 3 AC 400 V/N/PE 50 Hz
8 - TN-S system distribution
9 - Second supply (Line 2) 3 AC 400 V/N/PE 50 Hz

Wiring diagram UMC710D4-HA



1 - TN-S system distribution
2 - Other devices with BMS bus
3 - Remote alarm indicator and test combination MK24…
4 - Other MK…
5 - Remove the terminating resistor, if additional bus devices are connected here.
6 - Automatic interlocking function
7 - Preferred supply (Line 1) 3 AC 400 V/N/PE 50 Hz
8 - Second supply (Line 2) 3 AC 400 V/N/PE 50 Hz
9 - Manual/automatic operated TMX-HA operator panel

Wiring diagram UMC710D4-E1



1 - Other devices with BMS bus
2 - Remote alarm indicator and test combination MK…
3 - Insulation monitoring main OP light
4 - Other MK…
5 - Remove the terminating resistor, if additional bus devices are connected here
6 - Before connecting an insulation monitoring device for main OP lights, remove the bridge
7 - Manual/automatic control
8 - Common alarm PRC487
9 - Common alarm 107TD47
10 - Preferred supply (Line 1) 3 AC 400 V/N/PE 50 Hz
11 - Second supply (Line 2) 3 AC 400 V/N/PE 50 Hz
12 - TN-S system distribution 3 AC 400 V/N/PE 50 Hz
13 - Isolating transformer 230/230 V
14 - IT distribution AC 230 V 50 Hz

Ordering information

Type	Applied switching elements	Rated operational current I_e (AC-3) max.	Rated operational current I_e acc. to DIN VDE 0100-710 max	Fuse max.	Max. power consumption	Art. No.
UMC710D4-29	S	65 A	29 A	80 A gL/gG	40 W	B 9205 7071
UMC710D4-29-E1	S	65 A	29 A	80 A gL/gG	44 W	B 9205 7073
UMC710D4-29-HA	S	65 A	29 A	80 A gL/gG	44 W	B 9205 7075
UMC710D4-42	S	95 A	42 A	100 A gL/gG	40 W	B 9205 7072
UMC710D4-42-E1	S	95 A	42 A	100 A gL/gG	44 W	B 9205 7074
UMC710D4-42-HA	S	95 A	42 A	100 A gL/gG	44 W	B 9205 7076
UMC710D4-160	L	160 A	160 A	160 A gL/gG	51 W	B 9205 7078
UMC710D4-160-HA	L	160 A	160 A	160 A gL/gG	55 W	B 9205 7083
UMC710D4-250	L	250 A	250 A	250 A gL/gG	83 W	B 9205 7079
UMC710D4-250-HA	L	250 A	250 A	250 A gL/gG	87 W	B 9205 7084
UMC710D4-400	L	400 A	400 A	800 A gL/gG	168 W	B 9205 7080
UMC710D4-400-HA	L	400 A	400 A	800 A gL/gG	172 W	B 9205 7085
UMC710D4-630	L	630 A	630 A	800 A gL/gG	168 W	B 9205 7081
UMC710D4-630-HA	L	630 A	630 A	800 A gL/gG	172 W	B 9205 7086

S = mechanically latched contactors, L = motor-operated switch disconnectors
* Control unit with power unit

Dimension and weights

Type	Dimensions control unit fields/rows (W/H/D mm)	Dimensions power unit fields/rows (W/H/D mm)	Recommended cabinet depth	Weight
UMC710D4-29	2/4* (500/600/220)	–	300 mm	15 kg
UMC710D4-29-E1	2/4* (500/600/220)	–	300 mm	18 kg
UMC710D4-29-HA	2/4* (500/600/220)	–	300 mm	16 kg
UMC710D4-42	2/4* (500/600/230)	–	300 mm	17 kg
UMC710D4-42-E1	2/4* (500/600/230)	–	300 mm	19 kg
UMC710D4-42-HA	2/4* (500/600/230)	–	300 mm	18 kg
UMC710D4-160	2/2 (500/300/130)	2/3 (500/450/260)	400 mm	18 kg
UMC710D4-160-HA	2/2 (500/300/130)	2/3 (500/450/260)	400 mm	20 kg
UMC710D4-250	2/2 (500/300/130)	2/3 (500/450/260)	400 mm	18 kg
UMC710D4-250-HA	2/2 (500/300/130)	2/3 (500/450/260)	400 mm	20 kg
UMC710D4-400	2/2 (500/300/130)	2 x 2/4 (2 x 500/600/280)	400 mm	65 kg
UMC710D4-400-HA	2/2 (500/300/130)	2 x 2/4 (2 x 500/600/280)	400 mm	66 kg
UMC710D4-630	2/2 (500/300/130)	2 x 2/4 (2 x 500/600/280)	400 mm	65 kg
UMC710D4-630-HA	2/2 (500/300/130)	2 x 2/4 (2 x 500/600/280)	400 mm	66 kg

Technical data changeover equipment UMC710D4 – UMC710D4-HA – UMC710D4-E1

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 400 V
Rated impulse voltage/pollution degree	4 kV/3

Power unit/ switching elements

Switching elements	up to 42 A: latched contactors 63 A and higher: switch disconnectors
Rated operational voltage U_e	3/N AC 400/230 V
Operating range U_e	0.8…1.15 x U_e
Frequency f_e	50…60 Hz
Rated operational current I_e (acc. to IEC 60364-7-710)	see ordering information
Fuse UMC710D4-29	see ordering information
Utilization category	AC-3
Changeover period, adjustable	≤ 0.5 s…20 s

Supply voltage devices

Supply voltage devices U_S	AC 230 V
Operating range of U_S	0.8…1.15 x U_e
Frequency range of U_S	50…60 Hz
Power consumption	see ordering information

Control and indicating device PRC487

Display, characters	LCD, illuminated, 2 x 16 characters
Control inputs	≤ DC 5 V

Voltage monitoring

Response value undervoltage, adjustable	0.7…0.9 x U_e
Response value overvoltage	1.15 x U_e
Response time t_{an}	50…250 ms
Response time t_{off}, adjustable (50 ms steps)	0…9950 ms
Return transfer time t_{on}, adjustable (1 s steps)	0…249 s
Delay time, adjustable (50 ms steps)	0…9950 ms

A-ISOMETER® 107TD47 (version -E1 only)

Display, characters	LCD, illuminated, 2 x 16 characters
Test button	internal/ external

Insulation monitoring 107TD47 (version -E1 only)

Response value R_{an} adjustable	50…500 kΩ
Relative percentage error	0…+ 10 %
Hysteresis	≤ 25 %
Response time t_{an} at R_F = 0.5 x R_{an} and C_e = 1µF	≤ 3 s
Measuring voltage U_m	≤ 12 V
Measuring current I_m (at R_F = 0 Ω)	≤ 50 µA
Internal DC resistance R_i	≥ 240 kΩ
Impedance Z_i at 50 Hz	≥ 200 kΩ
Permissible extraneous DC voltage U_{fg}	≤ DC 375 V
Permissible system leakage capacitance C_e	≤ 5 µF

Load current monitoring 107TD47 (version -E1 only)

Response value, adjustable	5…50 A
Hysteresis	≤ 4 %
Temperature influence	≤ 0.15 %/°C

Temperature monitoring 107TD47 (version -E1 only)

Response value	4 kΩ
Release value	1.6 kΩ
PTC resistors acc. to DIN 44081	max. 6 in series

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	PRC487: 2…30 Version E1: PRC487: 2…30; 107TD47: 2…30
Factory-set device address	PRC487: 4, Version -E1: PRC487: 4, 107TD47: 3

Switching elements (alarm contacts PRC487)

Number of changeover contacts	1 changeover contact
Operating principle	N/C operation

Switching elements (alarm contacts 107TD47) (version -E1 only)

Number of changeover contacts	1 changeover contact
Operating principle, adjustable	N/C or N/O operation

Contact data acc. to IEC 60947-5-1

Rated operational voltage U_e	AC 230 V / DC 220 V
Rated operational current I_e	AC 5 A / DC 0.2 A
Utilization category	AC 14/DC 12
Electrical service life, number of cycles	10.000
Minimum contact load	1 mA at AC / DC > 10 V

Terminals

Control unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/AWG 28-12
Stripping length	8…9 mm

Power supply unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	6…35 mm²/AWG 8-2 (63 A and higher: direct connection)
Stripping length	23 mm

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Storage	1K4
Operating temperature	-10 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M1
Long-time storage	1M3
Operating mode	continuous operation
Mounting position	vertical
Degree of protection, internal components (IEC 60529)	IP30
Degree of protection, terminals (IEC 60529)	IP20
Mounting into standard distribution panels	see table “Dimensions and weights”
Flammability class	UL94V-0
Product standards	IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)
Operating manual	TGH1371
Weight	table “Dimensions and weights”

Changeover module UMC108E

UMC108E – Typical example

Device features

- Complete solution for changeover between the normal power supply and the safety power supply
- Factory-made, tested module for time and cost-saving installation
- Reliable changeover within t ≤ 0.5 s
- Nominal current I_n 25…80 A
- Suitable for all common DIN rail systems
- Screwless-type connection technique
- Bus technology for easy installation and reduced fire load
- Plain text display provides concise information
- Clear menu structure with LC display allows easy parameter setting
- Power supply for MK2430/MK800
- Voluntary testing by TÜV Süddeutschland

Product description

The factory-made modules of the UMC108E-… series are designed to change over between two power supply sources, e.g. safety devices, safety lighting etc. Information exchange between the changeover equipment and the alarm indicator and operator units is established via bus technology. The module is suitable for mounting onto all common DIN rail systems (equipment racks have to be provided by the customer).

Application

- Changeover between two power supply sources of AC systems in building distribution boards.

Function

In fault-free condition, the preferred supply line is switched on. If the voltage drops below the set response value, changeover to the second supply will automatically take place. The changeover period can be set individually. In order to ensure operational readiness, the second line as well as the output of the changeover equipment (Line 3) are monitored too. On voltage recovery, return to the preferred supply line occurs automatically. Owing to variable delay times (return transfer time or pause time), the UMC meets the individual installation-specific requirements (e.g. coordination of several changeover modules, reduction of switching energy). The function of the changeover equipment can be tested via the test button.

Functions in accordance with DIN VDE 0108

- Voltage monitoring with control function
  - on the preferred supply
  - on the second supply
  - at the output of the changeover module
- Changeover period t ≤ 0.5…20 s
- Protection against wrong operation by multiple interlocking
- Cables laid to resist short-circuits and earth faults
- Control circuit with single fault tolerance
- Automatic return on recovery of the voltage
- functional testing including checking of the operating times

Further measures to increase the electrical safety

- Continuous monitoring of the actuation devices and automatic processes (coil, control contacts, connections).
- Monitoring for short-circuits upstream and at the output of the changeover device and the pre-defined switching behaviour.

Single fault tolerance

The changeover modules continuously monitor the functions and in this way ensure that an individual, foreseeable error cannot lead to a failure of the power supply at the output of the automatic changeover equipment.

Indications/messages

- Plain text messages display for all essential operating, fault and alarm messages.
- Information exchange between alarm indicator and operator units via BMS bus
- Common alarm contact with protective separation in accordance with DIN EN 50178

Technical data changeover equipment UMC108E

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Power unit/ switching elements

Switching elements	latched contactors
Rated operational voltage U_e	N AC 230 V
Operating range U_e	0.8…1.15 x U_e
Frequency f_e	50…60 Hz
Rated operational current I_e (acc. to IEC 60364-7-710)	see ordering information
Fuse	see ordering information
Utilization category	AC-3
Changeover period, adjustable	≤ 0.5 s…20 s

Supply voltage devices

Supply voltage devices U_S	AC 230 V
Operating range of U_S	0.8…1.15 x U_e
Frequency range of U_S	50…60 Hz
Power consumption	see ordering information

Control and indicating device PRC487

Display, characters	LCD, illuminated, 2 x 16 characters
Control inputs	≤ DC 5 V

Voltage monitoring

Response value undervoltage, adjustable	0.7…0.9 x U_e
Response value overvoltage	1.15 x U_e
Response time t_{an}	50…250 ms
Response time t_{off} adjustable (50 ms steps)	0…9950 ms
Return transfer time t_{on} adjustable (1 s steps)	0…249 s
Delay time, adjustable (50 ms steps)	0…9950 ms

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	PRC487: 2…30
Factory-set device address	PRC487: 4

Switching elements (alarm contacts PRC487)

Number of changeover contacts	1 changeover contact
Operating principle	N/C operation

Contact data acc. to IEC 60947-5-1

Rated operational voltage U_e	AC 230 V / DC 220 V
Rated operational current I_e	AC 5 A / DC 0.2 A
Utilization category	AC 14/DC 12
Electrical service life, number of cycles	10.000
Minimum contact load	1 mA at AC / DC > 10 V

Terminals

Control unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/AWG 28-12
Stripping length	8…9 mm

Power supply unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	6…35 mm²/AWG 8-2
Stripping length	23 mm

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Storage	1K4
Operating temperature	-10 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M1
Long-time storage	1M3
Operating mode	continuous operation
Mounting position	vertical
Degree of protection, internal components (IEC 60529)	IP30
Degree of protection, terminals (IEC 60529)	IP20
Mounting into standard distribution panels	see table “Dimensions and weights”
Flammability class	UL94V-0
Product standards	DIN VDE 0100-718 (VDE 0100-718)
Operating manual	TGH1322 + supplementary sheet
Weight	table “Dimensions and weights”

Ordering information

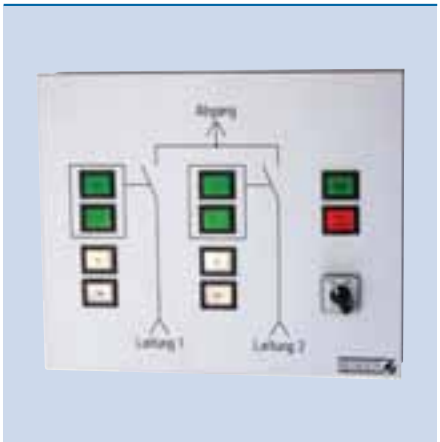
Type	Rated operational current I_e(AC-3)	Fuse max.	Power consumption max.	Art. No
UMC108E-25	25 A	25 A gL/gG	26 W	B 9205 6007
UMC108E-65	65 A	80 A gL/gG	34 W	B 9205 6008
UMC108E-80	80 A	100 A gL/gG	34 W	B 9205 6009

Dimension and weights

Type	Dimensions fields/rows (W/H/D mm)	Recommended cabinet depth	Weight approx.
UMC108E-25	1/5 (250/750/220)	300 mm	12 kg
UMC108E-65	1/5 (250/750/220)	300 mm	13 kg
UMC108E-80	1/5 (250/750/230)	300 mm	14 kg

TMX-HA operator panel

Alarm indicator and operator panel for manual/automatic operation of changeover equipment of the UMC…-HA und USC…-HA series



TMX-HA

Device features

- Front plate made of anodized aluminium
- Indicator lights for Line 1/2: On, Automatic, Fault/Manual mode
- Indicator lights for Line 1/2: voltage present, alternatively: circuit breaker Q1/Q2 triggered
- Pushbutton On/Off Line 1/2
- Engraved block diagram
- Toggle switch for manual/automatic changeover

Product description

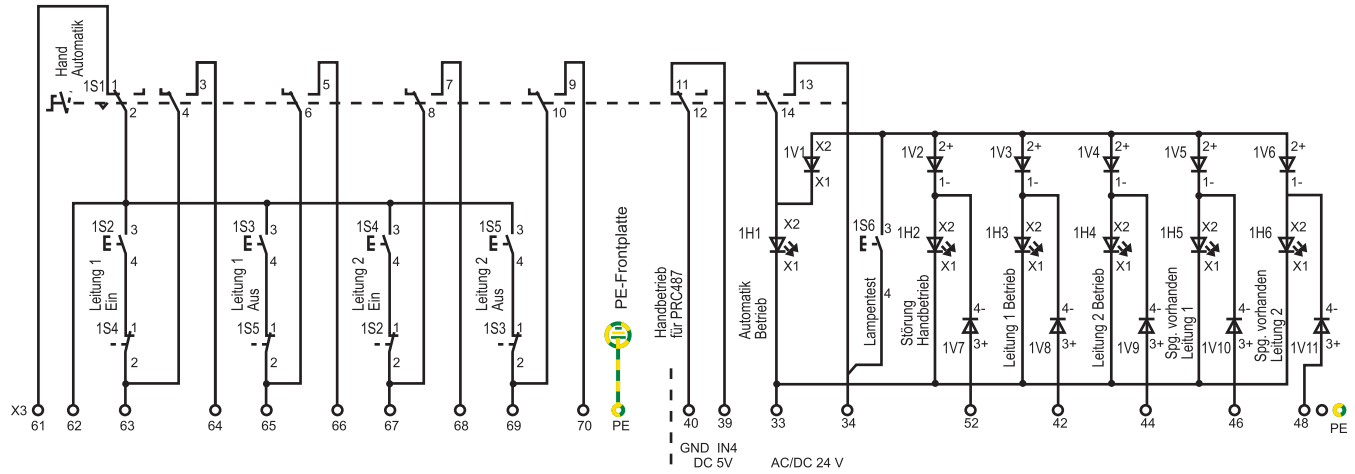
The TMX-HA alarm indicator and operator panel is used to select manual or automatic operating mode at the changeover equipment UMC…-HA or the control module USC…-HA. The panel is recommended to be installed in the cabinet door of the distribution board incorporating the changeover equipment. By means of a toggle switch manual or automatic mode can be selected. Indicator lights show the respective operating mode. In the manual mode, the respective line is switched on via the buttons On/Off.

An additional indicator light “Fault/manual mode” is built-in to signal faults in the changeover equipment. The other indicator lights are designed to indicate the current operating condition of Line 1 and Line 2.

Functions

- Toggle switch for manual/automatic changeover
- On/Off button for Line 1 and Line 2 in manual mode
- Indicator light “Fault/Manual mode” lights up on the occurrence of a fault in the changeover module equipment or indicates manual mode.
- Indicator light “Automatic” lights up in case of automatic mode.
- Two green “On” indicator lights for Line 1 and Line 2 alternatively: “K1 On”, “K2 On” or “Q1 On”, “Q2 On”
- Two green indicator lights “Voltage present” or “AV voltage present” “UPS voltage present”; alternatively two red indicator lights for “Q1 triggered” and “Q2 triggered” for use in conjunction with circuit breakers.

Wiring diagram



Plug-in terminal strip 10-pole AC 230 V — **Plug-in terminal strip 10-pole DC 5 V / AC/DC 42 V**

Technical data

Rated insulation voltage	230 V, 50…60 Hz
Type of voltage	AC
Supply voltage indicator lights	AC/DC 24 V

Built-in components

Indicator light “K1 On”	labelled: On/K1 On/Q1 On
Indicator light “K2 On”	labelled: On/K2 On/Q2 On
Two indicator lights	labelled: voltage present
Alternative labelling	AV voltage present, SV voltage present, UPS voltage present, when used in conjunction with circuit-breakers: Q1 (Q2) triggered
“On” button Line 1	yes
“On” button Line 2	yes
“Off” button Line 1	yes
“Off” button Line 2	yes
Indicator light “Fault/Manual mode”	yes
Indicator light “Automatic mode”	yes
Toggle switch manual/automatic	yes

General data

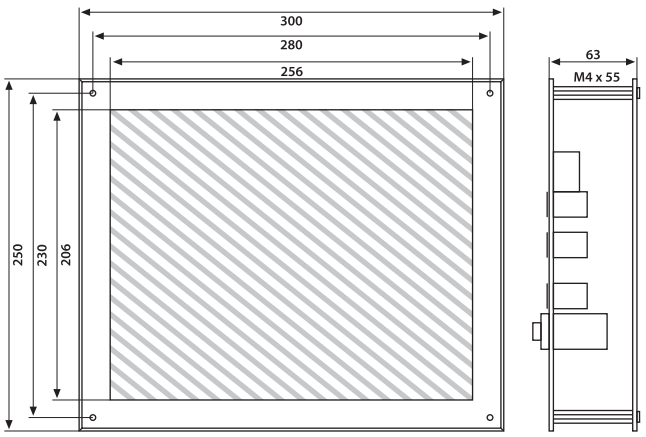
EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Degree of protection, internal components/terminals (DIN EN 60529)	IP30/IP20
Protection class	Class I
Ambient temperature	- 5 °C…+ 55 °C
Product standards	IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)
Weight	≤ 1400 g

Ordering information

Type	Art. No.
TMX-HA	B 9202 4051

Dimension diagram

Dimensions are given in mm



Changeover and monitoring modules for group 2 medical locations

Chapter 2.2

Solutions for the power supply of group 2 medical locations, e.g. operating theatre rooms, intensive care units

Changeover and monitoring modules for use in accordance with DIN VDE 0100-710: 2002-11 para. 710.537.6.2 “Distributon boards for the power supply of group 2 medical locations”.

Changeover and monitoring module UFC107E

Changeover and monitoring module with single fault tolerance for medical IT systems featuring a built-in insulation fault location system

UFC107E – Typical example

Device features

- Complete solution for changeover, IT system monitoring and insulation fault location
- Factory-made, tested module for installation that saves both time and costs
- Variable changeover period t ≤ 0.5…20 s
- Concise IT system monitoring (insulation, load, transformer temperature)
- Insulation fault location during operation
- Fast localization of faulty subcircuits
- Insulation fault location system for 6…24 subcircuits
- Two-pole circuit breakers for each subcircuit
- Suitable for all common DIN rail systems
- Screwless-type connection technique
- Bus technology for easy installation and reduced fire load
- Clear menu structure with LC display allows easy parameter setting
- Power supply for MK2430/MK800

Product description

The factory-made modules of the UFC107E series are used to change over (t ≤ 0.5 s) between two supply sources (AV/SV resp. SV/UPS) and for IT system monitoring in medical locations. The UFC107E features an insulation fault location system to localize insulation faults in 6, 12, 18 or 24 outgoing circuits during operation. Each outgoing circuit has a two-pole circuit breaker. Status indication and alarm texts on the alarm indicator and operator units takes place via bus technology. The module is suitable for mounting onto all common DIN rail systems (equipment racks have to be provided by the customer).

Functions in accordance with IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)

- Voltage monitoring with control function
  - on the preferred supply (Line 1)
  - on the second supply (Line 2)
  - at the output of the changeover module (Line 3)
- Variable changeover period t ≤ 0.5…20 s
- Protection against wrong operation by multiple interlocking
- Cables laid to resist short-circuits and earth faults
- Control circuit with single fault tolerance
- Automatic return on recovery of the voltage
- Functional testing including checking of the operating times
- Insulation, load current and temperature monitoring for IT systems in group 2 medical locations
- Monitoring of the system/PE connections of the insulation monitoring device

Further measures to increase the electrical safety

- Continuous functional monitoring of the actuation devices and automatic processes (coil, control contacts, connections)
- Monitoring of essential connecting leads such as to
  - current transformers
  - transformer temperature sensors

Monitoring for short-circuits upstream and at the output of the changeover device and the pre-defined switching behaviour.

Single fault tolerance

The changeover modules continuously monitor the functions and in this way ensure that an individual, foreseeable error cannot lead to a failure of the power supply at the output of the automatic changeover and monitoring module: (DIN VDE 0100-710: 2002-11 para. 710.521.6 control circuits).

Indications/messages

- Plain text messages display for all essential operating, fault and alarm messages
- Information exchange between alarm indicator and operator units via BMS bus
- Common alarm contact with protective separation in accordance with EN 50178 for insulation fault location systems

Description of the changeover function

In fault-free condition, the preferred supply line is switched on. If the voltage drops below the set response value, changeover to the second supply will automatically take place. The changeover period can be set individually. In order to ensure operational readiness, the second line as well as the output of the changeover module (Line 3) are monitored too. On voltage recovery, return to the preferred supply line occurs automatically. Owing to variable delay times (return transfer time or delay time), the UFC module meets the individual installation-specific requirements (e.g. coordination of several changeover modules, reduction of switching energy). The function of the changeover module can be tested via the test button.

Description of the IT system monitoring function

In group 2 medical locations safe and reliable operation must be guaranteed in case of an insulation fault or transient overload. Therefore, in this case, IT systems are used for the supply of electrical loads to monitor the insulation, load and temperature of isolating transformers.

Insulation monitoring with the AMP measuring principle avoids that DC components which can be caused by electronic devices influence the measurement. If the insulation resistance falls below the set response value or if the load current or the transformer temperature exceed the threshold value, an alarm message is indicated and the common alarm contact switches.

Continuous self monitoring of the monitoring module, the measuring leads for insulation, load and temperature monitoring, provides high availability of the system. Interactive device monitoring via the bus informs about device failure.

The test button can be used to simulate faults and in this way check the function of the monitoring module.

Insulation fault location system (EDS system)

In Group 2 medical locations featuring a large number of socket outlet circuits and/or loads (e.g. intensive care units), locating faulty circuits or loads can often be a time-consuming and difficult task for medical and technical personnel. The EDS insulation fault location system solves this problem by automatically locating the insulation fault during operation.

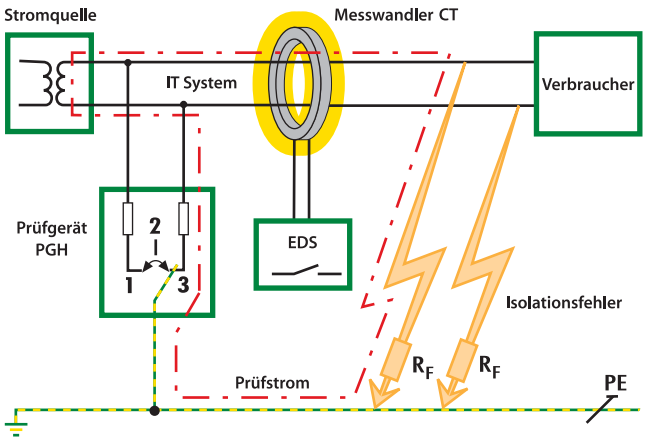
This results in two decisive advantages: fault location and availability are optimized in terms of both time and cost, because the system remains in operation during automatic fault location.

Function of the EDS system

The insulation fault location process starts when the A-ISOMETER® 107TD47 reports an insulation fault. The insulation fault test device PGH474 generates a test current of max. 1 mA. This test current flows via the point of insulation fault and via the earth wire (PE wire) back to the test device. The test current is detected by a measuring current transformer located on the fault path and reported by the EDS474 evaluator via the bus. The faulty circuit or load is identified by means of an assignment between the measuring current transformer/subcircuit and a unique text message, e.g. on a TM alarm indicator and operator panel, on the MK800 or the MK2430 alarm indicator and test combination.

Retrofitting

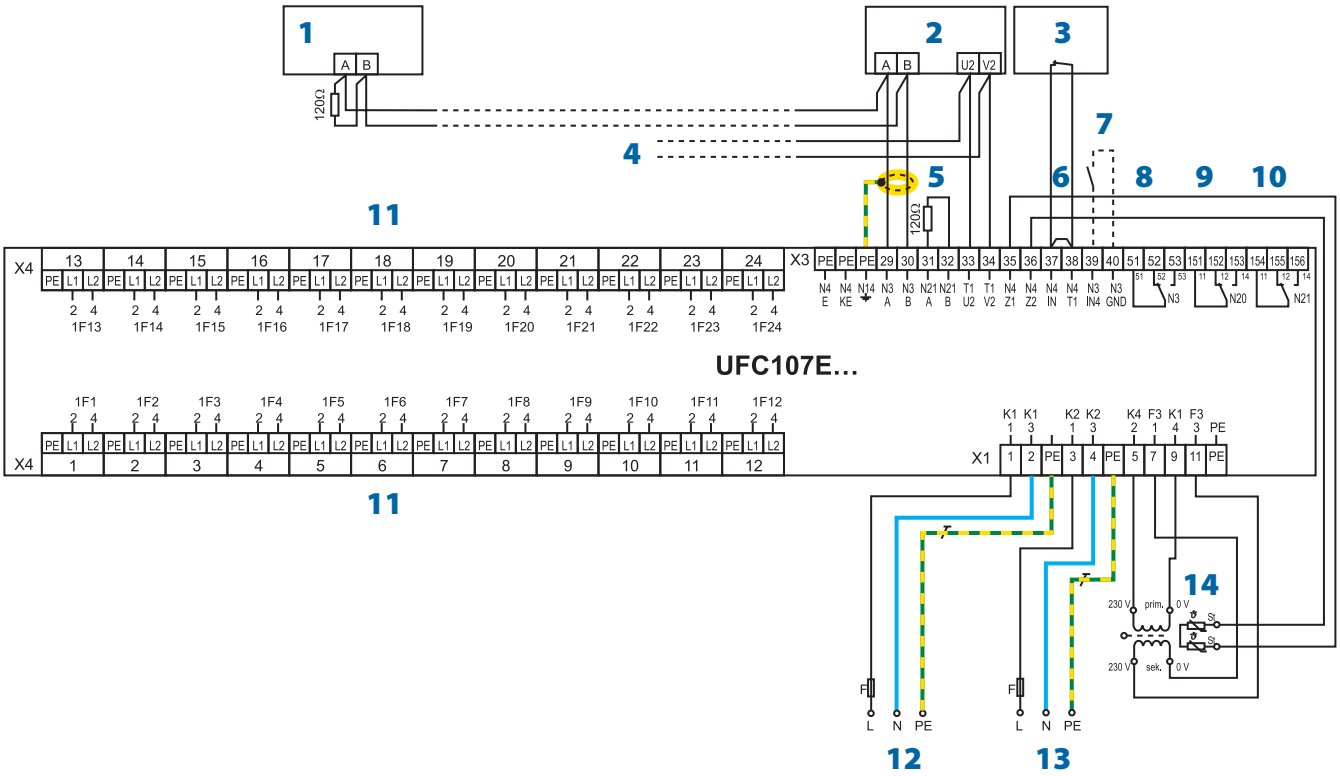
Existing IT systems can easily be retrofitted with insulation fault location systems (EDS).



Insulation fault location principle

2.2

Wiring diagram UFC107E with 24 outgoing circuits



1 - Other devices connected to the BMS bus

2 - Remote alarm indicator and test combination MK…

3 - Insulation monitoring main OP light

4 - Other MK…

5 - Remove the terminating resistor, if additional bus devices are connected here

6 - Before connecting an insulation monitoring device for main OP lights, remove the bridge

7 - Manual/automatic control

8 - Common alarm control and indicating device PRC487

9 - Common alarm insulation fault evaluator EDS461-L-2 (1)

10 - Common alarm insulation fault evaluator EDS461-L-2 (2)

11 - IT system outgoing circuits

12 - Preferred supply source AC 230 V 50 Hz

13 - Second supply source AC 230 V 50 Hz

14 - Isolating transformer for IT system 230/230 V

Technical data changeover and monitoring module UFC107E

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Power unit/ switching elements

Switching elements	latched contactors
Rated operational voltage U_e	AC 230 V
Operating range U_e	0.8…1.15 x U_e
Frequency f_e	50…60 Hz
Rated operational current I_e (acc. to IEC 60364-7-710)	see ordering information
Fuse	see ordering information
Utilization category	AC-3
Changeover period, adjustable	≤ 0.5 s…20 s

Supply voltage devices

Supply voltage devices U_S	AC 230 V
Operating range of U_S	0.8…1.15 x U_e
Frequency range of U_S	50…60 Hz
Power consumption	see ordering information

Control and indicating device PRC487

Display, characters	LCD, illuminated, 2 x 16 characters
Control inputs	≤ DC 5 V

Voltage monitoring

Response value undervoltage, adjustable	0.7…0.9 x U_e
Response value overvoltage	1.15 x U_e
Response time t_{an}	50…250 ms
Response time t_{off} adjustable (50 ms steps)	0…9950 ms
Return transfer time t_{on} adjustable (1 s steps)	0…249 s
Pause time, adjustable (50 ms steps)	0…9950 ms

A-ISOMETER® 107TD47

Display, characters	LCD, illuminated, 2 x 16 characters
Test button	internal/ external

Insulation monitoring 107TD47

Response value R_{an} adjustable	50…500 kΩ
Relative percentage error	0…+10 %
Hysteresis	≤ 25 %
Response time t_{an} at R_F = 0.5 x R_{an} and C_e = 1µF	≤ 3 s
Measuring voltage U_m	≤ 12 V
Measuring current Im (at R_F = 0 Ω)	≤ 50 µA
Internal DC resistance R_i	≥ 240 kΩ
Impedance Z_i at 50 Hz	≥ 200 kΩ
Permissible extraneous DC voltage U_{fg}	≤ DC 375 V
Permissible system leakage capacitance C_e	≤ 1 µF

Load monitoring 107TD47

Response value, adjustable	5…50 A
Hysteresis	≤ 4 %
Temperature influence	≤ 0.15 %/ °C

Temperature monitoring 107TD47

Response value	4 kΩ
Release value	1.6 kΩ
PTC resistors acc. to DIN 44081	max. 6 in series

Test device PGH474

Test current IT	≤ 1 mA
Test pulse/break	2 s / 4 s

Evaluator EDS461-L

Measuring current transformer type	W10/8000
Response sensitivity	0.2…1 mA
Number of measuring channels	12 (max. 1068)
Scanning time for 12 channels	≤ 10 s

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	PRC487: 2…90 – 107TD47: 2…30 PGH: 111…119 – EDS: 1…90
Factory-set device address	PRC487: 4 – 107TD47: 3 – PGH: 111 – EDS: 5 (6)

Switching elements (alarm contacts PRC487)

Number of changeover contacts	2 x 1 changeover contact
Operating principle	N/C operation

Switching elements (alarm contacts EDS)

Number of changeover contacts	1 changeover contact
Operating principle, adjustable	N/C operation

Contact data acc. to IEC 60947-5-1

Electrical service life, number of cycles					10.000
Utilization category	AC-13	AC-14	DC-12	DC-12	DC-12
Rated operational voltage U_e	230 V	230 V	24 V	110 V	220 V
Rated operational current I_e	5 A	3 A	1 A	0,2 A	0,1 A
Minimum contact load					1 mA at AC / DC > 10 V

Terminals

Control unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/AWG 28-12
Stripping length	8…9 mm

Power supply unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	6…35 mm²/AWG 8-2
Stripping length	23 mm

Outgoing circuits

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/4 mm²/AWG 28-12
Stripping length	6…7 mm

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Long-time storage	1K4
Operating temperature	-10 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M1
Long-time storage	1M3
Operating mode	continuous operation
Mounting position	vertical
Degree of protection, internal components /terminals (DIN EN 60529)	IP30 / IP20
Mounting into standard distribution panels	see table “Dimensions and weights”
Flammability class	UL94V-0
Product standard	IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)
Operating manual	TGH1378
Weight	table “Dimensions and weights”

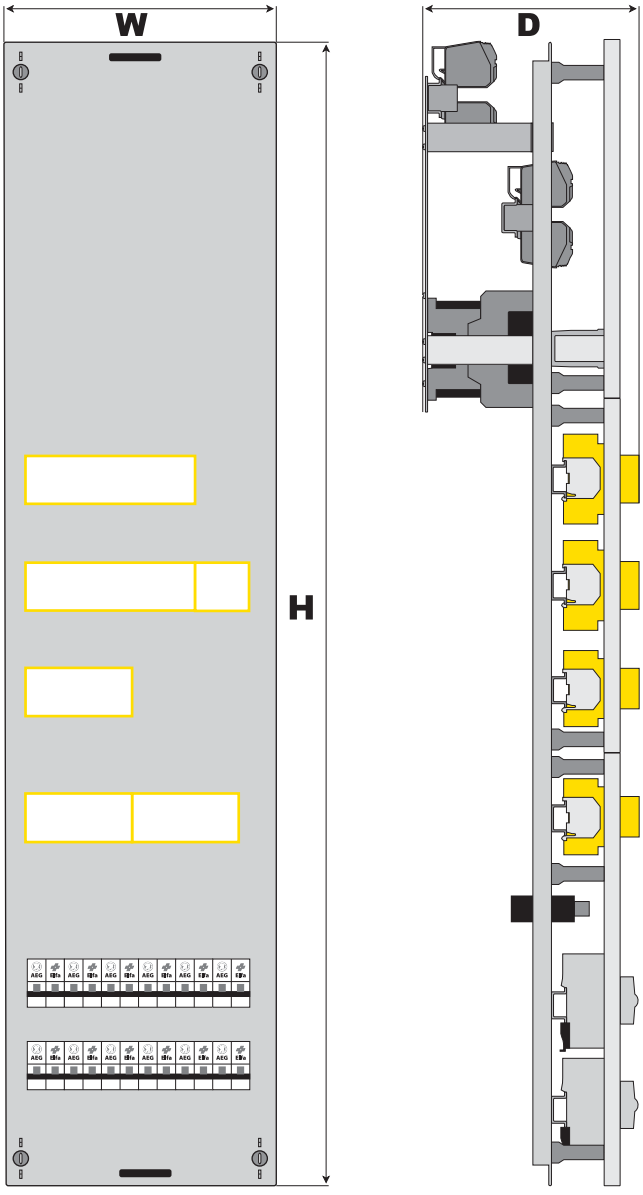
2.2

Ordering information

Type	Outgoing circuits	Circuit breaker*	Rated operational current I_e (AC-3) changeover module	Rated operational current I_e acc. to DIN VDE 0100-710	Max. permissible fuse	Recommended rated power of transformer	Max. power consumption	Art. No.
UFC107E65-06-B10	6	B10	65 A	29 A	80 A gL/gG	3.15…6.3 kVA	51 W	B 9205 4004
UFC107E65-06-B16	6	B16	65 A	29 A	80 A gL/gG	3.15…6.3 kVA	51 W	B 9205 4000
UFC107E65-12-B10	12	B10	65 A	29 A	80 A gL/gG	3.15…6.3 kVA	51 W	B 9205 4005
UFC107E65-12-B16	12	B16	65 A	29 A	80 A gL/gG	3.15…6.3 kVA	51 W	B 9205 4001
UFC107E65-18-B16	18	B16	65 A	29 A	80 A gL/gG	3.15…6.3 kVA	54 W	B 9205 4002
UFC107E65-24-B16	24	B16	65 A	29 A	80 A gL/gG	3.15…6.3 kVA	54 W	B 9205 4003
UFC107E80-06-B10	6	B10	80 A	42 A	100 A gL/gG	8 kVA	51 W	B 9205 4014
UFC107E80-06-B16	6	B16	80 A	42 A	100 A gL/gG	8 kVA	51 W	B 9205 4010
UFC107E80-12-B10	12	B10	80 A	42 A	100 A gL/gG	8 kVA	51 W	B 9205 4015
UFC107E80-12-B16	12	B16	80 A	42 A	100 A gL/gG	8 kVA	51 W	B 9205 4011
UFC107E80-18-B16	18	B16	80 A	42 A	100 A gL/gG	8 kVA	54 W	B 9205 4012
UFC107E80-24-B16	24	B16	80 A	42 A	100 A gL/gG	8 kVA	54 W	B 9205 4013

* Other circuit breakers on request

Dimension diagram



Dimension and weights

Type	Dimensions field/rows (W/H/D mm)	Recommended cabinet depth	Weigth approx.
UFC 107 E65-06 - B10	1/8 (250/1200/220)	300 mm	19 kg
UFC 107 E65-06 - B16	1/8 (250/1200/220)	300 mm	19 kg
UFC 107 E65-12 - B10	1/9 (250/1350/220)	300 mm	23 kg
UFC 107 E65-12 - B16	1/9 (250/1350/220)	300 mm	23 kg
UFC 107 E65-18 - B16	2/5 (500/750/220)	300 mm	
UFC 107 E65-24 - B16	2/6 (500/900/220)	300 mm	26 kg
UFC 107 E80-06 - B10	1/8 (250/1200/230)	300 mm	22 kg
UFC 107 E80-06 - B16	1/8 (250/1200/230)	300 mm	22 kg
UFC 107 E80-12 - B10	1/9 (250/1350/230)	300 mm	26 kg
UFC 107 E80-12 - B16	1/9 (250/1350/230)	300 mm	26 kg
UFC 107 E80-18 - B16	2/5 (500/750/230)	300 mm	
UFC 107 E80-24 - B16	2/6 (500/900/230)	300 mm	29 kg

Subject to change!

Changeover and monitoring module UMC107E

Changeover and monitoring module with single fault tolerance for medical IT systems

UMC107E – Typical example

Device features

- Complete solution for changeover and IT system monitoring up to 80/42 A
- Factory-made, tested module for installation that saves both time and costs
- Variable changeover period t ≤ 0.5…20 s
- Concise IT system monitoring (insulation, load, transformer temperature
- Connection monitoring
- Suitable for all common DIN rail systems
- Screwless-type connection technique
- Bus technology for easy installation and reduced fire load
- Clear menu structure with LC display allows easy parameter setting
- Power supply for MK2430/MK800
- Voluntary testing by TÜV Süddeutschland

Product description

The factory-made modules of the UMC107E series are used to change over (t ≤ 0.5 s) between two supply sources (AV/SV resp. SV/UPS) and for IT system monitoring in medical locations. Status indication and alarm texts on the alarm indicator and operator units takes place via BMS bus. The module is suitable for mounting onto all common DIN rail systems (equipment racks have to be provided by the customer).

Functions in accordance with IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)

- Voltage monitoring with control function
  - on the preferred supply (Line 1)
  - on the second supply (Line 2)
  - at the output of the changeover module (Line 3)
- Variable changeover period t ≤ 0.5…20 s
- Protection against wrong operation by multiple interlocking
- Cables laid to resist short-circuits and earth faults
- Control circuit with single fault tolerance
- Automatic return on recovery of the voltage
- Functional testing including checking of the operating times
- Insulation, load current and temperature monitoring for IT systems in group 2 medical locations
- Monitoring of the system/PE connections of the insulation monitoring device
- Available with insulation monitoring for for main OP lighting circuits

Further measures to increase the electrical safety

- Continuous functional monitoring of the actuation devices and automatic processes (coil, control contacts, connections)
- Monitoring of essential connecting leads such as to
  - current transformers
  - transformer temperature sensors

Monitoring for short-circuits upstream and at the output of the changeover device and the pre-defined switching behaviour.

Single fault tolerance

The changeover modules continuously monitor the functions and in this way ensure that an individual, foreseeable error cannot lead to a failure of the power supply at the output of the automatic changeover and monitoring module (DIN VDE 0100-710: 2002-11 para. 710.521.6 control circuits).

Indications/messages

- Plain text messages display for all essential operating, fault and alarm messages.
- Information exchange between alarm indicator and operator units via BMS bus
- Common alarm contact with protective separation in accordance with EN 50178

Description of the changeover function

In fault-free condition, the preferred supply line is switched on. If the voltage drops below the set response value, changeover to the second supply will automatically take place. The changeover period can be set individually. In order to ensure operational readiness, the second line as well as the output of the changeover module (Line 3) are monitored too. On voltage recovery, return to the preferred supply line occurs automatically. Owing to variable delay times (return transfer time or pause time), the UMC meets the individual installation-specific requirements (e.g. coordination of several changeover modules, reduction of switching energy). The function of the changeover module can be tested via the test button.

Description of the IT system monitoring function

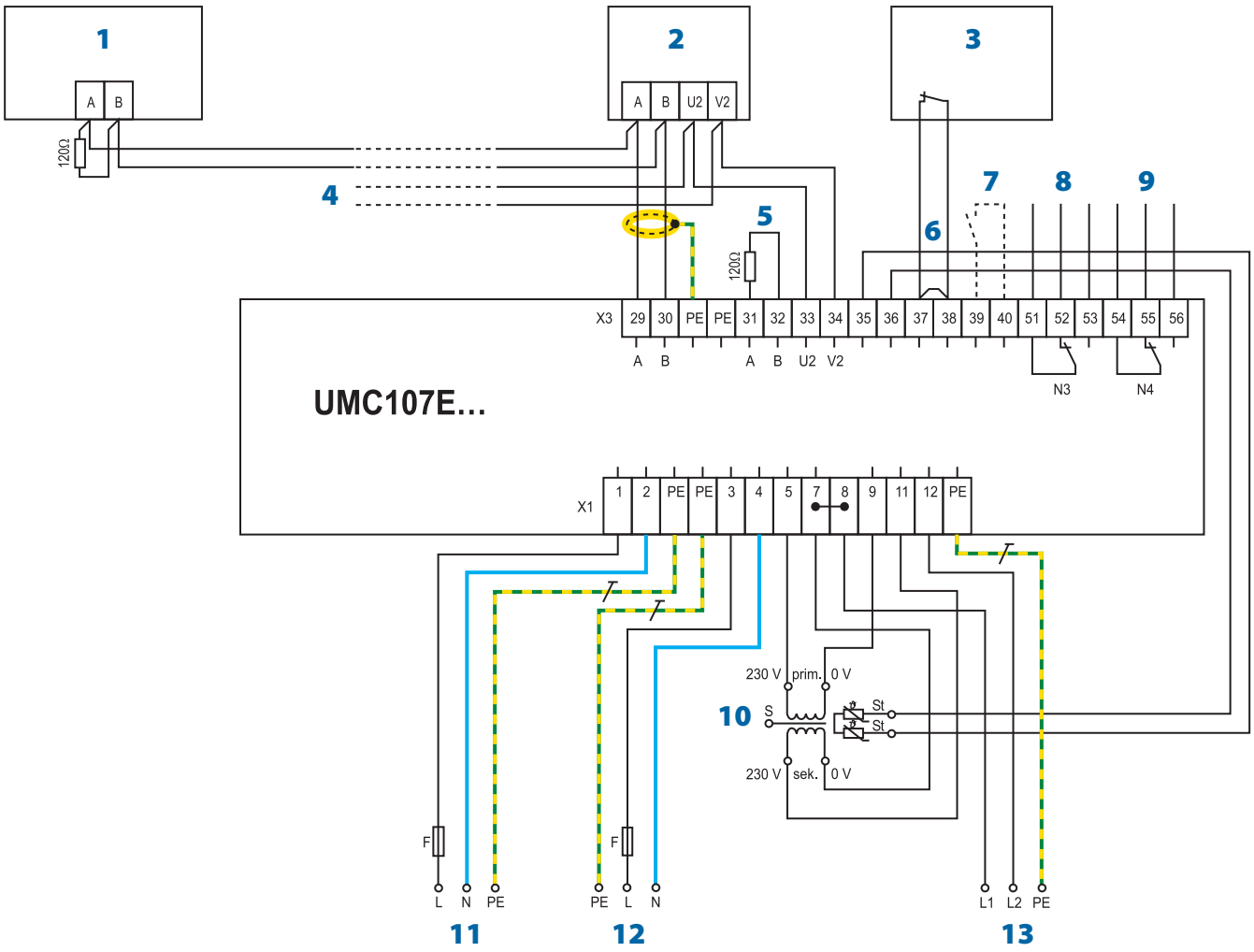
In group 2 medical locations safe and reliable operation must be guaranteed in case of an insulation fault or transient overload. Therefore, in this case, IT systems are used for the supply of electrical loads to monitor the insulation, load and temperature of isolating transformers.

Insulation monitoring with the AMP measuring principle avoids that DC components which can be caused by electronic devices influence the measurement. If the insulation resistance falls below the set response value or if the load current or the transformer temperature exceed the threshold value, an alarm message is indicated and the common alarm contact switches.

Continuous self monitoring of the monitoring module, the measuring leads for insulation, load and temperature monitoring, provides high availability of the system. Interactive device monitoring via the bus informs about device failure.

The test button can be used to simulate faults and in this way check the function of the monitoring module.

Wiring diagram



1 - Other devices connected to the BMS bus
2 - Remote alarm indicator and test combination MK…
3 - Insulation monitoring main OP light
4 - Other MK…
5 - Remove the terminating resistor, if additional bus devices are connected here
6 - Before connecting an insulation monitoring device for main OP lights, remove the bridge
7 - Manual/automatic control
8 - Common alarm control and indicating device PRC487
9 - Common alarm insulation monitoring device 107TD47
10 - Isolating transformer for IT system s230/230 V
11 - Preferred supply (Line 1) AC 230 V 50 Hz
12 - Second supply (Line 2) AC 230 V 50 Hz
13 - IT system AC 230 V 50 Hz

Technical data changeover and monitoring module UMC107E

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Power unit / switching elements

Switching elements	latched contactors
Rated operational voltage U_e	AC 230 V
Operating range U_e	0.8…1.15 x U_e
Frequency f_e	50…60 Hz
Rated operational current I_e (acc. to IEC 60364-7-710)	see ordering information
Fuse	see ordering information
Utilization category	AC-3
Changeover period, adjustable	≤ 0.5 s…20 s

Supply voltage devices

Supply voltage devices U_S	AC 230 V
Operating range of U_S	0.8…1.15 x U_e
Frequency range of U_S	50…60 Hz
Power consumption	see ordering information

Control and indicating device PRC487

Display, characters	LCD, illuminated, 2 x 16 characters
Control inputs	≤ DC 5 V

Voltage monitoring

Response value undervoltage, adjustable	0.7…0.9 x U_e
Response value overvoltage	1.15 x U_e
Response time t_{an}	50…250 ms
Response time t_{off} adjustable (50 ms steps)	0…9950 ms
Return transfer time t_{on} adjustable (1 s steps)	0…249 s
Pause time, adjustable (50 ms steps)	0…9950 ms

A-ISOMETER® 107TD47

Display, characters	LCD, illuminated, 2 x 16 characters
Test button	internal/ external

Insulation monitoring 107TD47

Response value R_{an} adjustable	50…500 kΩ
Relative percentage error	0…+10 %
Hysteresis	≤ 25 %
Response time t_{an} at R_F = 0.5 x R_{an} and C_e = 1µF	≤ 3 s
Measuring voltage U_m	≤ 12 V
Measuring current I_m (at R_F = 0 Ω)	≤ 50 µA
Internal DC resistance R_i	≥ 240 kΩ
Impedance Z_i at 50 Hz	≥ 200 kΩ
Permissible extraneous DC voltage U_{fg}	≤ DC 375 V
Permissible system leakage capacitance C_e	≤ 5 µF

Load monitoring 107TD47

Response value, adjustable	5…50 A
Hysteresis	≤ 4 %
Temperature influence	≤ 0.15 % / °C

Temperature monitoring 107TD47

Response value	4 kΩ
Release value	1.6 kΩ
PTC resistors acc. to DIN 44081	max. 6 in series

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	PRC487: 2…90 – 107TD47: 2…30
Factory-set device address	PRC487: 4 – 107TD47: 3

Switching elements (alarm contacts PRC487)

Number of changeover contacts	1 changeover contact
Operating principle	N/C operation

Switching elements (alarm contacts 107TD47)

Number of changeover contacts	1 changeover contact
Operating principle, adjustable	N/C or N/O operation

Contact data acc. to IEC 60947-5-1

Rated operational voltage U_e	AC 230 V / DC 220 V
Rated operational current I_e	AC 5 A / DC 0.2 A
Utilization category	AC 14/DC 12
Electrical service life, number of cycles	10.000
Minimum contact load	1 mA at AC / DC > 10 V

Terminals

Control unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/AWG 28-12
Stripping length	8…9 mm

Power supply unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	6…35 mm²/AWG 8-2
Stripping length	23 mm

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Long-time storage	1K4
Operating temperature	-10 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M1
Long-time storage	1M3
Operating mode	continuous operation
Mounting position	vertical
Degree of protection, internal components (IEC 60529)	IP30
Degree of protection, terminals (IEC 60529)	IP20
Mounting into standard distribution panels	see table “Dimensions and weights”
Flammability class	UL94V-0
Product standards	IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)
Operating manual	TGH1322
Weight	table “Dimensions and weights”

Ordering information

Type	Rated operational current I_e (AC-3) changeover module	Rated operational current I_e acc. to DIN VDE 0100-710	Permissible max. fuse	Recommended rated power of transformer	Max. power consumption	Art. No.
UMC107E65	65 A	29 A	80 A gL/gG	3.15…6.3 kVA	19 W	B 9205 6002
UMC107E65-0L	65 A	29 A	80 A gL/gG	3.15…6.3 kVA	21 W	B 9205 6005
UMC107E80	80 A	42 A	100 A gL/gG	8 kVA	19 W	B 9205 6003
UMC107E80-0L	80 A	42 A	100 A gL/gG	8 kVA	21 W	B 9205 6006

Dimension and weights

Type	Dimensions fields/rows (W/H/D mm)	Recommended cabinet depth	Weight approx.
UMC107E65	1/6 (250/900/220)	300 mm	14 kg
UMC107E65-0L	1/6 (250/900/220)	300 mm	15 kg
UMC107E80	1/6 (250/900/230)	300 mm	15 kg
UMC107E80-0L	1/6 (250/900/230)	300 mm	16 kg

Monitoring module LFC107E

Monitoring module with single fault tolerance for medical IT systems featuring a built-in insulation fault location system

LFC107E – Typical example

Device features

- Complete solution for IT system monitoring and insulation fault location
- Factory-made, tested module for time and cost-saving installation
- IT system monitoring (insulation, load, transformer temperature)
- Connection monitoring
- Internal functional testing
- Fast localization of faulty subcircuits during operation
- Insulation fault location for 6…24 subcircuits
- Two-pole circuit breakers for each outgoing circuit
- Clear menu structure with LC display allows easy parameter setting
- Bus technology for easy installation and reduced fire load
- Power supply for MK2430/MK800
- Screwless-type connection technique
- Suitable for all common DIN rail systems

Product description

The factory-made modules of the LFC107E series are used to monitor IT systems in medical locations. The LFC107E features an insulation fault location system to localize insulation faults in 6, 12, 18 or 24 outgoing circuits during operation. Each outgoing circuit has a two-pole circuit breaker. Status indication and alarm texts on the alarm indicator and operator units takes place via bus technology. The module is suitable for mounting onto all common DIN rail systems (equipment racks have to be provided by the customer).

Functions in accordance with IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)

- Cables laid to resist short-circuits and earth faults
- Control circuit with single fault tolerance
- Monitoring of the system/PE connections of the insulation monitoring device
- Insulation, load current and temperature monitoring for IT systems in group 2 medical locations
- Functional testing including checking of the operating times.

Further measures to increase the electrical safety

- Monitoring of essential connecting leads such as
  - current transformers
  - transformer temperature sensors

Description of the IT system monitoring function

In group 2 medical locations safe and reliable operation must be guaranteed in case of an insulation fault or transient overload. Therefore, in this case, IT systems are used for the supply of electrical loads to monitor the insulation, load and temperature of isolating transformers.

Insulation monitoring with the AMP measuring principle avoids that DC components which can be caused by electronic devices influence the measurement. If the insulation resistance falls below the set response value or if the load current or the transformer temperature exceed the threshold value, an alarm message is indicated and the common alarm contact switches.

Continuous self monitoring of the monitoring module, the measuring leads for insulation, load and temperature monitoring, provides high availability of the system. Interactive device monitoring via the bus informs about device failure.

The test button can be used to simulate faults and in this way check the function of the monitoring module.

Indications/messages

- Text display of all major operating, fault and alarm messages
- Information exchange between alarm indicator and operator units via BMS bus
- Common alarm contact with protective separation for the insulation fault location system

Insulation fault location system (EDS system)

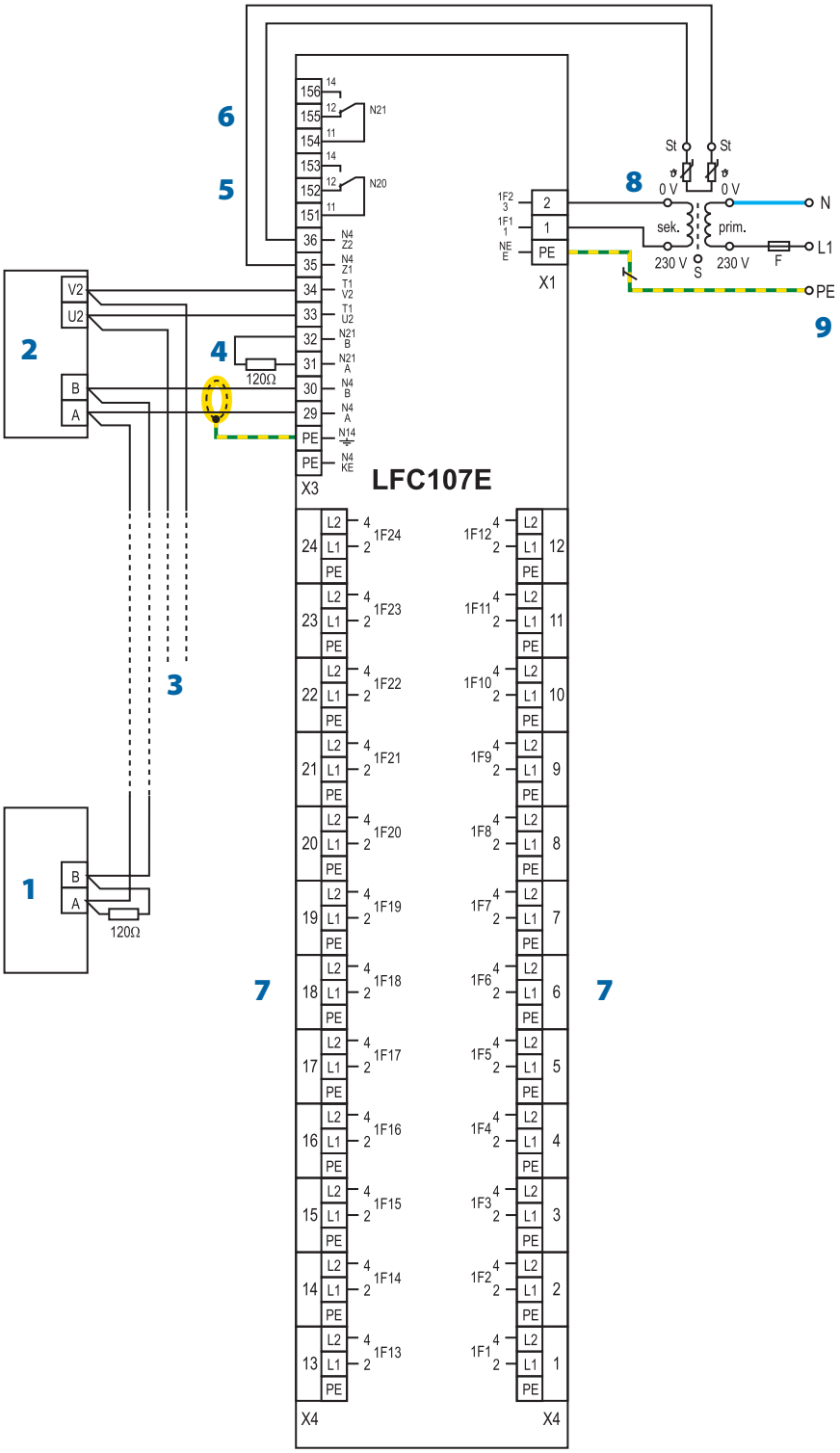
In Group 2 medical locations featuring a large number of socket outlet circuits and/or loads (e.g. intensive care units), locating faulty circuits or loads can often be a time-consuming and difficult task for medical and technical personnel. The EDS insulation fault location system solves this problem by automatically locating the insulation fault during operation.

This results in two decisive advantages: fault location and availability are optimized in terms of both time and cost, because the system remains in operation during automatic fault location.

Insulation fault location

The insulation fault location process starts when the A-ISOMETER® 107TD47 reports an insulation fault. The PGH474 test device generates a test current of max. 1 mA. This test current flows via the insulation fault location and via the earth wire (PE wire) back to the test device. The test current is detected by a measuring current transformer located on the fault path and reported by the EDS461-L-2 evaluator via the bus. The faulty circuit or load is identified by means of an assignment between the measuring current transformer/ subcircuit and a unique text message, e.g. on a TM alarm indicator and operator panel, on the MK800 or the MK2430 alarm indicator and test combination.

Wiring diagram LFC107E with 24 outgoing circuits



1 - Other devices connected to the BMS bus

2 - Remote alarm indicator and test combination MK…

3 - Other MK…

4 - Remove the terminating resistor, if additional bus devices are connected here

5 - Common alarm insulation fault evaluator EDS461-L-2 (1)

6 - Common alarm insulation fault evaluator EDS461-L-2 (2)

7 - IT system outgoing circuits

8 - Isolating transformer for IT systems 230 V/230 V

9 - AC 230 V 50 Hz

Technical data monitoring module LFC107E

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Supply voltage devices

Supply voltage devices U_S	AC 230 V
Operating range of U_S	0.8…1.15 x U_e
Frequency range of U_S	50…60 Hz
Power consumption	see ordering information

A-ISOMETER® 107TD47

Display, characters	LCD, illuminated, 2 x 16 characters
Test button	internal/ external

Insulation monitoring 107TD47

Response value R_{an} adjustable	50…500 kΩ
Relative percentage error	0…+ 10 %
Hysteresis	≤ 25 %
Response time t_{an} at $R_F = 0.5$ x R_{an} and $C_e = 1$ µF	≤ 3 s
Measuring voltage U_m	≤ 12 V
Measuring current Im (at $R_F = 0$ Ω)	≤ 50 µA
Internal DC resistance R_i	≥ 240 kΩ
Impedance Z_i at 50 Hz	≥ 200 kΩ
Permissible extraneous DC voltage U_{fg}	≤ DC 375 V
Permissible system leakage capacitance C_e	≤ 1 µF

Load monitoring 107TD4

Response value, adjustable	5…50 A
Hysteresis	≤ 4 %
Temperature influence	≤ 0.15 % / °C

Temperature monitoring 107TD47

Response value/release value	4 kΩ/1.6 kΩ
PTC resistors acc. to DIN 44081	max. 6 in series

Test device PGH474

Test current IT	≤ 1 mA
Test pulse/break	2 s / 4 s

Evaluator EDS461

Measuring current transformer type	W10/8000
Evaluating current I_E	≥ 0.5 mA
Number of measuring channels	12 (max. 1068)
Scanning time for 12 channels	≤ 72 s

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	107TD47: 2…30 – PGH: 111…119 – EDS: 61…90
Factory-set device address	107TD47: 3 – PGH: 111 – EDS: 4 (5)

Switching elements (alarm contacts EDS)

Number of changeover contacts	1 changeover contact
Operating principle, adjustable	N/C operation

Contact data acc. to IEC 60947-5-1

Rated operational voltage U_e	AC 230 V / DC 220 V
Rated operational current I_e	AC 5 A / DC 0.2 A
Utilization category	AC 14/DC 12
Electrical service life, number of cycles	10.000
Minimum contact load	1 mA at AC / DC > 10 V

Terminals

Control unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/AWG 28-12
Stripping length	8…9 mm

Power supply unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	6…16 mm²/AWG 24-6
Stripping length	16…17 mm

Outgoing circuits

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/4 mm²/AWG 28-12
Stripping length	6…7 mm

General data

EMC immunity / EMC emission	acc. to EN 61000-6-2 / EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Storage	1K4
Operating temperature - 10 °C…+ 55 °C	
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M1
Long-time storage	1M3
Operating mode	continuous operation
Mounting position	vertical
Degree of protection, internal components /terminal (DIN EN 60529)	IP30 / IP20
Mounting into standard distribution panels	see table “Dimensions and weights”
Flammability class	UL94V-0
Product standards	IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)
Operating manual	T GH1378 + supplementary sheet
Weight	table “Dimensions and weights”

Ordering information

Type	Outgoing circuits	Circuit-breaker*	Max. power consumption	Art. No.
LFC107E06-B16	6	B16	16 W	B 9205 3000
LFC107E12-B16	12	B16	16 W	B 9205 3001
LFC107E18-B16	18	B16	19 W	B 9205 3002
LFC107E24-B16	24	B16	19 W	B 9205 3003

* Other circuit breakers on request

Dimension and weights

Type	Dimensions fields/rows (W/H/D mm)	Recommended cabinet depth	Weigth approx.
LFC107E06-B16	1 / 4 (250/600/130)	300 mm	7 kg
LFC107E12-B16	1 / 5 (50/750/130)	300 mm	8 kg
LFC107E18-B16	1 / 7 (250/1050/130)	300 mm	9 kg
LFC107E24-B16	1 / 8 (250/1200/130)	300 mm	10 kg

Monitoring module LTIC107E/D

Monitoring module with single fault tolerance for medical IT systems

LTIC107E – Typical example

Device features

- Complete solution for IT system monitoring
- Factory-made, tested module for time and cost-saving installation
- IT system monitoring (insulation, load, transformer temperature)
- Connection monitoring
- Internal functional testing
- Clear menu structure allows easy parameter setting
- Bus technology for easy installation and reduced fire load
- Power supply for MK2430/MK800
- Screwless-type connection technique
- Suitable for all common DIN rail systems

Product description

The factory-made modules of the LTIC107 series are designed for monitoring single-phase (LTIC107E) or three-phase (LTIC107D) IT systems in medical locations. Status indication and alarm texts on the alarm indicator and operator units takes place via bus technology. The module is suitable for mounting onto all common DIN rail systems (equipment racks have to be provided by the customer).

Functions in accordance with IEC 60364-7-710 / DIN VDE 0100-710

- Insulation monitoring IT system
- Load current monitoring IT system transformer
- Temperature monitoring IT system transformer
- Control circuit with single fault tolerance
- Cables laid to resist short-circuits and earth faults
- Functional test
- Monitoring of the system/PE connections of the insulation monitoring device

Further measures to increase the electrical safety

Monitoring of essential connecting leads, such as to

- Current transformers
- Temperature sensors

Indications/messages

- Plain text messages display for all essential operating, fault and alarm messages
- Information exchange between alarm indicator and operator units via BMS bus
- Common alarm contact with protective separation in accordance with EN 50178

Description of the IT system monitoring function

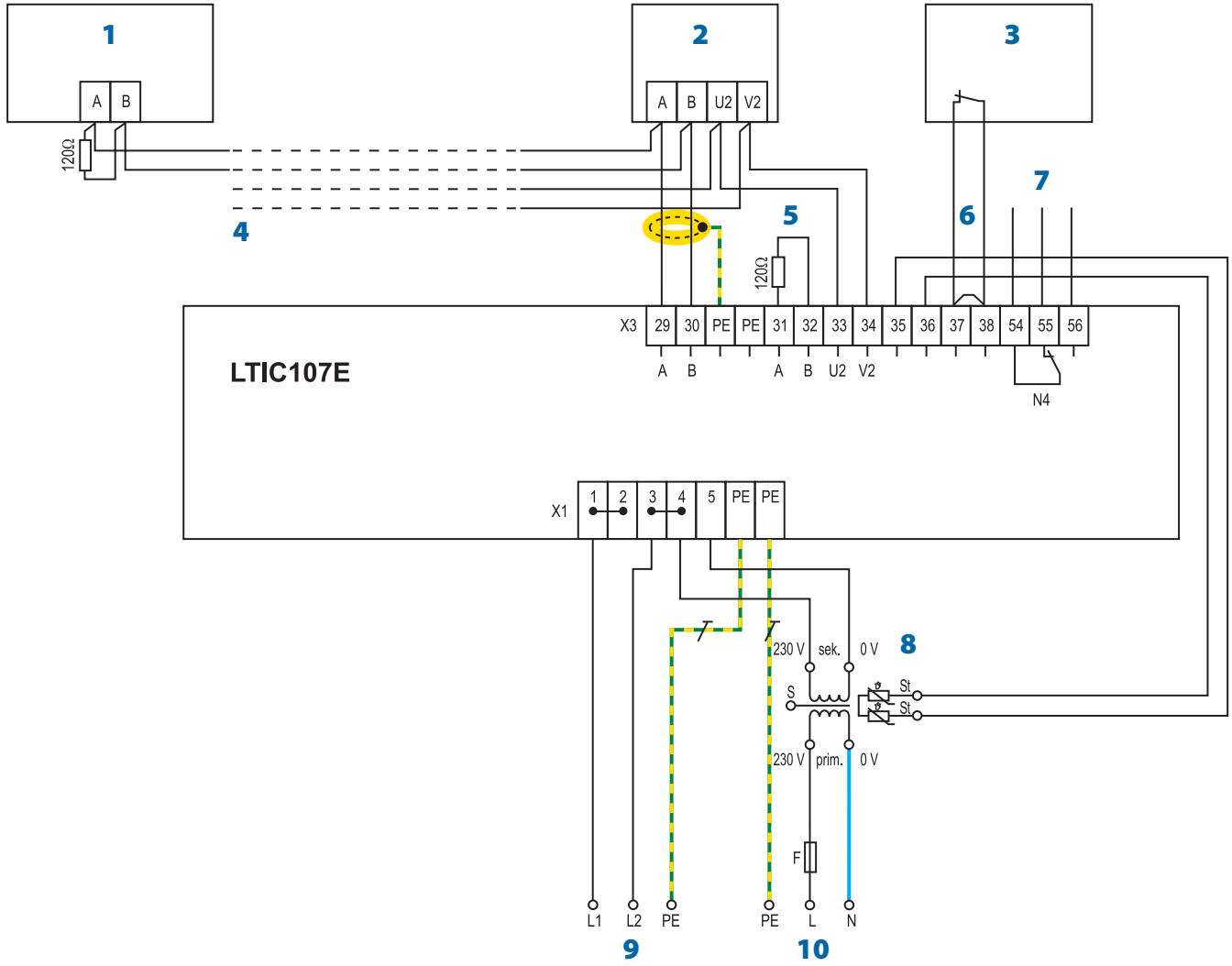
In group 2 medical locations safe and reliable operation must be guaranteed in case of an insulation fault or transient overload. Therefore, in this case, IT systems are used for the supply of electrical loads to monitor the insulation, load and temperature of isolating transformers.

Insulation monitoring with the AMP measuring principle avoids that DC components which can be caused by electronic devices influence the measurement. If the insulation resistance falls below the set response value or if the load current or the transformer temperature exceed the threshold value, an alarm message is indicated and the common alarm contact switches.

Continuous self monitoring of the monitoring module, the measuring leads for insulation, load and temperature monitoring, provides high availability of the system. Interactive device monitoring via the bus informs about device failure.

The test button can be used to simulate faults and in this way check the function of the monitoring module.

Wiring diagram



1 - Other devices connected to the BMS bus
2 - Remote alarm indicator and test combination MK…
3 - Insulation monitoring main OP light
4 - Other MK…
5 - Remove the terminating resistor, if additional bus devices are connected here.
6 - Before connecting an insulation monitoring device for main OP lights, remove the bridge.
7 - Common alarm insulation monitoring device 107TD47
8 - Isolating transformer for IT system
9 - IT system AC 230 V 50 Hz
10 - AC 230 V 50 Hz

Technical data monitoring module LTIC107E/D

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Supply voltage devices

Supply voltage devices U_S	AC 230 V
Operating range of U_S	0.8…1.15 x U_e
Frequency range of U_S	50…60 Hz
Power consumption	LTIC107E ≤ 10 W
	LTIC107D ≤ 14 W

A-ISOMETER® 107TD47

Display, characters	LCD, illuminated, 2 x 16 characters
Test button	internal/ external

Insulation monitoring 107TD47

Response value R_{an} adjustable	50…500 kΩ
Relative percentage error	0…+ 10 %
Hysteresis	≤ 25 %
Response time t_{an} at R_F = 0.5 x R_{an} and C_e = 1µF	≤ 3 s
Measuring voltage U_m	≤ 12 V
Measuring current Im (at R_F = 0 Ω)	≤ 50 µA
Internal DC resistance R_i	≥ 240 kΩ
Impedance Z_i at 50 Hz	≥ 200 kΩ
Permissible extraneous DC voltage U_{fg}	≤ DC 375 V
Permissible system leakage capacitance C_e	≤ 5 µF

Load monitoring 107TD47

Response value, adjustable	5…50 A
Hysteresis	≤ 4 %
Temperature influence	≤ 0.15 % / °C

Temperature monitoring 107TD47

Response value	4 kΩ
Release value	1.6 kΩ
PTC resistors acc. to DIN 44081	max. 6 in series

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	107TD47: 2…30
Factory-set device address	107TD47: 3

Switching elements (alarm contacts 107TD47)

Number of changeover contacts	1 changeover contact
Operating principle, adjustable	N/C or N/O operation

Contact data acc. to IEC 60947-5-1

Rated operational voltage U_e	AC 230 V / DC 220 V
Rated operational current I_e	AC 5 A / DC 0.2 A
Utilization category	AC 14/DC 12
Electrical service life, number of cycles	10.000
Minimum contact load	1 mA at AC / DC > 10 V

Terminals

Control unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/AWG 28-12
Stripping length	8…9 mm

Power supply unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	6…16 mm²/AWG 24-6
Stripping length	16…17 mm

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Long-time storage	1K4
Operating temperature	-10 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M1
Long-time storage	1M3
Operating mode	continuous operation
Mounting position	vertical
Degree of protection, internal components (IEC 60529)	IP30
Degree of protection, terminals (IEC 60529)	IP20
Mounting into standard distribution cabinets	see ordering information/dimensions and weights
Flammability class	UL94V-0
Product standards	IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)
Operating manual	TGH1343
Weight	see ordering information/dimensions and weights

Ordering information/dimensions and weights

Type	Dimensions fields/rows (W/H/D mm)	Recommended cabinet depth	Weight approx.	Art. No.
LTIC107E	1/2 (250/300/130)	300 mm	3 kg	B 9205 6004
LTIC107D	1/4 (250/600/130)	300 mm	3.4 kg	B 9205 7007

Article numbers for Striebel und John distribution board panels

Art. No. changeover module	Type	Min. cabinet depth	Required space panels	Required space rows	Art. No. equipment rack	Striebel und John's name of the item
B 9205 7101	USC710D4-01-HA	215 mm	2	3	B 991 932	2V00A
B 9205 7102	USC710D4-02-HA	215 mm	2	3	B 991 932	2V00A
B 9205 7103	USC710D4-03-HA	215 mm	2	4	B 991 929	2V0A
B 9205 7104	USC710D4-04-HA	215 mm	2	3	B 991 932	2V00A
B 9205 7105	USC710D4-05-HA	215 mm	2	3	B 991 932	2V00A
B 9205 7106	USC710D4-06-HA	215 mm	2	3	B 991 932	2V00A
B 9205 7107	USC710D4-07-HA	215 mm	2	3	B 991 932	2V00A
B 9205 7108	USC710D4-08-HA	215 mm	2	3	B 991 932	2V00A
B 9205 7071	UMC710D4-29	300 mm	2	4	B 991 929	2V0A
B 9205 7073	UMC710D4-29-E1	300 mm	2	4	B 991 929	2V0A
B 9205 7075	UMC710D4-29-HA	300 mm	2	4	B 991 929	2V0A
B 9205 7072	UMC710D4-42	300 mm	2	4	B 991 929	2V0A
B 9205 7074	UMC710D4-42-E1	300 mm	2	4	B 991 929	2V0A
B 9205 7076	UMC710D4-42-HA	300 mm	2	4	B 991 929	2V0A
B 9205 7078	UMC710D4-160	400 mm	2	5	B 991 937	2V1A
B 9205 7083	UMC710D4-160-HA	400 mm	2	5	B 991 937	2V1A
B 9205 7079	UMC710D4-250	400 mm	2	5	B 991 937	2V1A
B 9205 7084	UMC710D4-250-HA	400 mm	2	5	B 991 937	2V1A
B 9205 7080	UMC710D4-400	400 mm	2 x 2	6	on request	
B 9205 7085	UMC710D4-400-HA	400 mm	2 x 2	6	on request	
B 9205 7081	UMC710D4-630	400 mm	2 x 2	6	on request	
B 9205 7086	UMC710D4-630-HA	400 mm	2 x 2	6	on request	
B 9205 6007	UMC108E-25	300 mm	1	5	B 991 935	1V1KA
B 9205 6008	UMC108E-65	300 mm	1	5	B 991 935	1V1KA
B 9205 6009	UMC108E-80	300 mm	1	5	B 991 935	1V1KA
B 9205 4004	UFC107E65-06-B10	300 mm	1	8	B 991 947	1V4A
B 9205 4000	UFC107E65-06-B16	300 mm	1	8	B 991 947	1V4A
B 9205 4005	UFC107E65-12-B10	300 mm	1	9	B 911 945	1V5A
B 9205 4001	UFC107E65-12-B16	300 mm	1	9	B 911 945	1V5A
B 9205 4002	UFC107E65-18-B16	300 mm	2	5	B 991 937	2V1A
B 9205 4003	UFC107E65-24-B16	300 mm	2	6	B 991 942	2V2A
B 9205 4014	UFC107E80-06-B10	300 mm	1	8	B 991 947	1V4A
B 9205 4010	UFC107E80-06-B16	300 mm	1	8	B 991 947	1V4A
B 9205 4015	UFC107E80-12-B10	300 mm	1	9	B 911 945	1V5A
B 9205 4011	UFC107E80-12-B16	300 mm	1	9	B 911 945	1V5A
B 9205 4012	UFC107E80-18-B16	300 mm	2	5	B 991 937	2V1A
B 9205 4013	UFC107E80-24-B16	300 mm	2	6	B 991 946	2V2A
B 9205 6000	UMC107E-25	300 mm	1	6	B 991 902	1V23KA
B 9205 6001	UMC107E-40	300 mm	1	6	B 991 902	1V23KA
B 9205 6002	UMC107E-65	300 mm	1	6	B 991 902	1V23KA
B 9205 6005	UMC107E-65-0L	300 mm	1	6	B 991 902	1V23KA
B 9205 6003	UMC107E-80	300 mm	1	6	B 991 902	1V23KA
B 9205 6006	UMC107E-80-0L	300 mm	1	6	B 991 902	1V23KA
B 9205 3000	LFC107E06-B16	215 mm	1	4	B 991 900	1V0A
B 9205 3001	LFC107E12-B16	215 mm	1	5	B 991 943	1V1KA
B 9205 3002	LFC107E18-B16	215 mm	1	7	B 991 940	1V3A
B 9205 3003	LFC107E24-B16	215 mm	1	8	B 991 947	1V4A
B 9205 6004	LITC107E	215 mm	1	2	B 991 901	1V00A
B 9205 7007	LTIC107D	215 mm	1	4	B 991 900	1V0A
	Auxiliary equipment rackes for all types of modules				B 991 941	

Isolating transformers, accessories

Chapter 2.3

Solutions for safe and secure power supply in medical locations, e.g. operating theatre rooms, intensive care units

Isolating transformers for the design of medical IT systems in accordance with DIN VDE 0100-710:2002-11 para. 710.413.1.5 and IEC 60364-7-710:2002-11 para. 710.413.1.5 “Medical IT system” and VDE 0100-710:2002-11 para. 710.512.1.6.2 and IEC 60364-7-710:2002-11 para. 710.512.1.1, 710.512.1.6 “Transformers for IT systems”.

Isolating transformer ES710

Single-phase isolating transformers for the design of medical IT systems

ES710

Device features

- Built-in temperature sensors according to DIN 44081 (120 °C)
- Screen winding with brought-out insulated connection terminal
- Insulated mounting angles
- Degree of protection IP 00 (construction type: open)
- Degree of protection IP 23 (enclosure included)
- Protection class I
- Protection class II (option: completely encapsulated version)
- Reinforced insulation
- Classification of insulation: ta40/B
- Connections: screw terminals
- Noise level < 35 dB (A)(no-load and nominal load)
- Vector group: IiO
- VDE ENEC mark for the ES710/3150… ES710/10000 series

Application and description

The transformers of the ES710 series have reinforced insulation and comply with the requirements of IEC 61558-1 / DIN EN 61558-1 (VDE 0570-1) and IEC 61558-2-15 / DIN EN 61558-2-15 (VDE 0570-2-15).

In addition, the transformers comply with the requirements of IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710) for IT systems in medical locations. The windings are galvanically isolated. In order to minimize electrical interferences, an electrostatic screen is installed between the primary and secondary winding the lead out of which is connected to an insulated terminal for connection to the equipotential bonding.

The fixing angles are isolated from the transformer core in order to guarantee an isolated installation to comply with the requirements of DIN VDE 0100-710 (VDE 0100-710): 2002-11, para. 710.512.1.6.2).

The transformers are available for horizontal and vertical installation. Protection against corrosion is guaranteed by a complete resin impregnation.

The transformers are designed for use in dry locations. Transformers of the SK2 series are completely encapsulated and fulfil the requirements of protection class II.

Frequency / ratings

The transformers are designed for rated frequencies of 50…60 Hz. The values specified in the chapter “Technical data” refer to a maximum ambient temperature of 40 °C and a rated frequency of 50 Hz.

Temperature rise

Free air circulation must be ensured. An ambient temperature exceeding 40 °C will reduce the rated power. For temperature monitoring, a PTC thermistor is placed on each transformer leg and the leads are connected to the terminals.

Enclosure

Appropriate steel sheet enclosures, degree of protection IP 23, are available for all standard types of isolating transformers.

Rated power

According to DIN VDE 0100-710 (VDE 0100-710), the rated power of the transformer shall not be less than 3.15 kVA and shall not exceed 8 kVA.

Overload protection

When isolating transformers are used to form a medical IT system in accordance with para. 710.512.1.6.2 of DIN VDE 0100-710 (VDE 0100-710): 2002-11, **overload protection is not permitted**. In this case, short-circuit protection is required. That means, emphasis is focused on the availability of the power supply; it is therefore essential to avoid disconnection on the occurrence of transient overload. The protection of isolating transformers against overload and overtemperature can be realized by using monitoring devices in accordance with para. 710.531.3.1. The appropriate fuses for short-circuit protection can be selected from the table “Technical data”.

Standards

The ES710 series complies with the requirements of the following standards and regulations for the erection of electrical equipment: IEC 61558-1 / DIN EN 61558-1 (VDE 0570-1), IEC 61558-2-15 / DIN EN 61558-2-15 (VDE 0570-2-15), IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710).

Nameplate

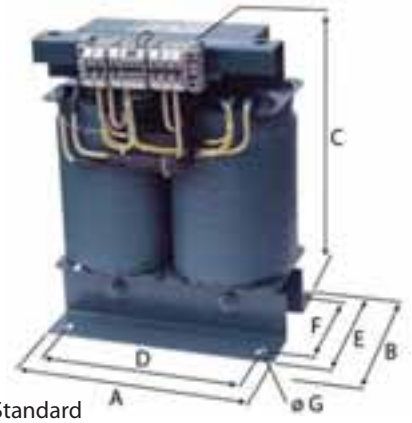
ES: single-phase isolating transformer
DS: three-phase isolating transformer
P rated power (VA)

ES710/3150SK2

Type series

without	=	standard
K	=	terminals on top
LG	=	horizontal position
SK2	=	encapsulation according to protection class II
S	=	terminals on top side end

Dimension diagram/type of construction



Standard
Dimension B is the depth incl. terminals

SK2 series

S series
Dimension E is the depth incl. terminals

K series

All other dimensions correspond to the standard dimensions.

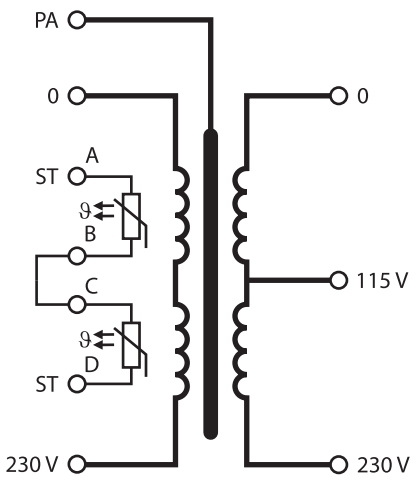
LG series

2.3

Ordering information, dimensions, weights

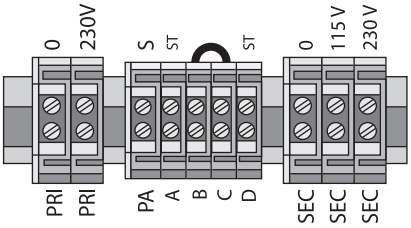
Type	A	B	C	D	E	F	G	Cu weight	Weight	Art. No.
ES710/3150	240 mm	230 mm	325 mm	200 mm	200 mm	160 mm	11 mm	15 kg	49 kg	B 924 211
ES710/4000	280 mm	220 mm	370 mm	240 mm	190 mm	150 mm	11 mm	24 kg	59 kg	B 924 212
ES710/5000	280 mm	230 mm	370 mm	240 mm	200 mm	160 mm	11 mm	25 kg	61 kg	B 924 213
ES710/6300	280 mm	245 mm	370 mm	240 mm	215 mm	175 mm	11 mm	26 kg	65 kg	B 924 214
ES710/8000	280 mm	260 mm	370 mm	240 mm	230 mm	190 mm	11 mm	27 kg	74 kg	B 924 215
ES710/10000	320 mm	280 mm	420 mm	270 mm	233 mm	193 mm	13 mm	39 kg	85 kg	B 924 216
ES710/3150K	240 mm		360 mm	200 mm	200 mm	160 mm	11 mm	15 kg	49 kg	B 924 221
ES710/4000K	280 mm		420 mm	240 mm	190 mm	150 mm	11 mm	24 kg	59 kg	B 924 222
ES710/5000K	280 mm		420 mm	240 mm	200 mm	160 mm	11 mm	25 kg	61 kg	B 924 223
ES710/6300K	280 mm		420 mm	240 mm	215 mm	175 mm	11 mm	26 kg	65 kg	B 924 224
ES710/8000K	280 mm		420 mm	240 mm	230 mm	190 mm	11 mm	27 kg	74 kg	B 924 225
ES710/10000K	320 mm		480 mm	270 mm	270 mm	193 mm	13 mm	39 kg	85 kg	B 924 226
ES710/3150LG	230 mm	235 mm	320 mm	204 mm		240 mm	9 mm	15 kg	49 kg	B 924 231
ES710/4000LG	260 mm	210 mm	365 mm	234 mm		280 mm	9 mm	24 kg	59 kg	B 924 232
ES710/5000LG	260 mm	220 mm	365 mm	234 mm		280 mm	9 mm	25 kg	61 kg	B 924 233
ES710/6300LG	260 mm	235 mm	365 mm	234 mm		280 mm	9 mm	26 kg	65 kg	B 924 234
ES710/8000LG	260 mm	250 mm	365 mm	234 mm		280 mm	9 mm	27 kg	74 kg	B 924 235
ES710/10000LG	294 mm	240 mm	410 mm	264 mm		320 mm	12 mm	39 kg	85 kg	B 924 236
ES710/3150SK2	380 mm	200 mm	450 mm	350 mm	270 mm	150 mm	11 mm	15 kg	69 kg	B 924 241
ES710/4000SK2	380 mm	190 mm	500 mm	350 mm	310 mm	150 mm	11 mm	24 kg	75 kg	B 924 242
ES710/5000SK2	380 mm	200 mm	500 mm	350 mm	310 mm	160 mm	11 mm	25 kg	77 kg	B 924 243
ES710/6300SK2	380 mm	215 mm	500 mm	350 mm	310 mm	175 mm	11 mm	26 kg	86 kg	B 924 244
ES710/8000SK2	380 mm	230 mm	500 mm	350 mm	310 mm	190 mm	11 mm	27 kg	90 kg	B 924 245
ES710/10000SK2	410 mm	240 mm	560 mm	380 mm	350 mm	200 mm	13 mm	39 kg	105 kg	B 924 246
ES710/3150S	280 mm	180 mm	370 mm	240 mm	290 mm	145 mm	11 x 25 mm	15 kg	49 kg	B 924 261
ES710/4000S	280 mm	150 mm	420 mm	240 mm	290 mm	115 mm	11 x 25 mm	24 kg	59 kg	B 924 262
ES710/5000S	280 mm	160 mm	420 mm	240 mm	290 mm	125 mm	11 x 25 mm	25 kg	61 kg	B 924 263
ES710/6300S	280 mm	175 mm	420 mm	240 mm	290 mm	140 mm	11 x 25 mm	26 kg	65 kg	B 924 264
ES710/8000S	280 mm	190 mm	420 mm	240 mm	290 mm	155 mm	11 x 25 mm	27 kg	74 kg	B 924 265
ES710/10000S	320 mm	233 mm	440 mm	270 mm	330 mm	193 mm	13 x 18 mm	39 kg	85 kg	B 924 266

Wiring diagram

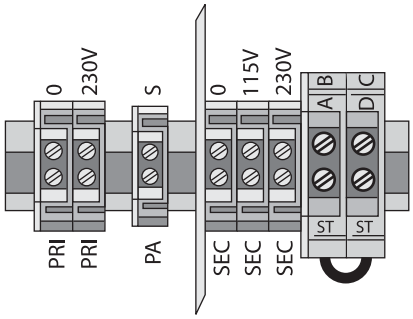


Terminal diagram

Standard,
K series,
LG series,
S series



SK2 series,



Cross sectional area of connecting cable

Type	Input terminals flexible/rigid	Screen winding flexible/rigid	Control terminals flexible/rigid	Control terminals for SK2 flexible/rigid	Output terminals flexible/rigid
ES710/3150	10/16 mm²	10/16 mm²	4/6 mm²	2.5/4 mm²	10/16 mm²
ES710/4000	16/25 mm²	16/25 mm²	4/6 mm²	2.5/4 mm²	16/25 mm²
ES710/5000	16/25 mm²	16/25 mm²	4/6 mm²	2.5/4 mm²	16/25 mm²
ES710/6300	16/25 mm²	16/25 mm²	4/6 mm²	2.5/4 mm²	16/25 mm²
ES710/8000	16/25 mm²	16/25 mm²	4/6 mm²	2.5/4 mm²	16/25 mm²

Technical data isolating transformer ES710

Type	ES710/3150	ES710/4000	ES710/5000	ES710/6300	ES710/8000	ES710/10000
Insulation classification	t_a40/B	t_a40/B	t_a40/B	t_a40/B	t_a40/B	t_a40/B
Degree of protection	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Protection class	I/II*	I/II*	I/II*	I/II*	I/II*	I/II*
Power/voltage/currents						
Rated power	3150 VA	4000 VA	5000 VA	6300 VA	8000 VA	10000 VA
Rated frequency	50…60 Hz	50…60 Hz	50…60 Hz	50…60 Hz	50…60 Hz	50…60 Hz
Rated input voltage	AC 230 V	AC 230 V	AC 230 V	AC 230 V	AC 230 V	AC 230 V
Rated input current I_n	14,2 A	18 A	22,5 A	28,5 A	36 A	45,3 A
Rated output voltage	AC 230/115 V	AC 230/115 V	AC 230/115 V	AC 230/115 V	AC 230/115 V	AC 230/115 V
Rated output current	13,7 A	17,4 A	21,7 A	27,4 A	34,7 A	43,5 A
Inrush current I_E	< 12 x $\hat{I}_n$	< 12 x $\hat{I}_n$	< 12 x $\hat{I}_n$	< 12 x $\hat{I}_n$	< 12 x $\hat{I}_n$	< 12 x $\hat{I}_n$
Leakage current	< 0,5 mA	< 0,5 mA	< 0,5 mA	< 0,5 mA	< 0,5 mA	< 0,5 mA
No-load input current i_0	< 3%	< 3%	< 3%	< 3%	< 2,8%	< 3%
No-load output voltage U_0	< 236 V	< 233 V	< 234 V	< 235 V	< 233 V	< 233 V
Short-circuit voltage U_k	< 2,9%	< 2,8%	< 2,6%	< 2,1%	< 2,2%	< 3%
General data						
Fuse	25 A gL/gG	35 A gL/gG	50 A gL/gG	50 A gL/gG	63 A gL/gG	80 A gL/gG
Induction	0,86 T	0,94 T	1 T	1,05 T	1 T	1,1 T
$R_{primary}$	0,245 Ω	0,133 Ω	0,099 Ω	0,08 Ω	0,064 Ω	0,055 Ω
$R_{secondary}$	0,228 Ω	0,108 Ω	0,095 Ω	0,07 Ω	0,056 Ω	0,033 Ω
FE loss	55 W	56 W	77 W	107 W	105 W	150 W
Cu loss	120 W	105 W	125 W	170 W	200 W	230 W
Efficiency	95%	96%	96%	96%	96%	96%
Ambient temperature max.	< 40 °C	< 40 °C	< 40 °C	< 40 °C	< 40 °C	< 40 °C
No-load temperature rise	< 22 °C	< 22 °C	< 26 °C	< 31 °C	< 33 °C	< 36 °C
Full-load temperature rise	< 55 °C	< 53 °C	< 62 °C	< 67 °C	< 76 °C	< 65 °C
Noise level (no load and full load)	< 35 dB(A)	< 35 dB(A)	< 35 dB(A)	< 35 dB(A)	< 35 dB(A)	< 35 dB(A)

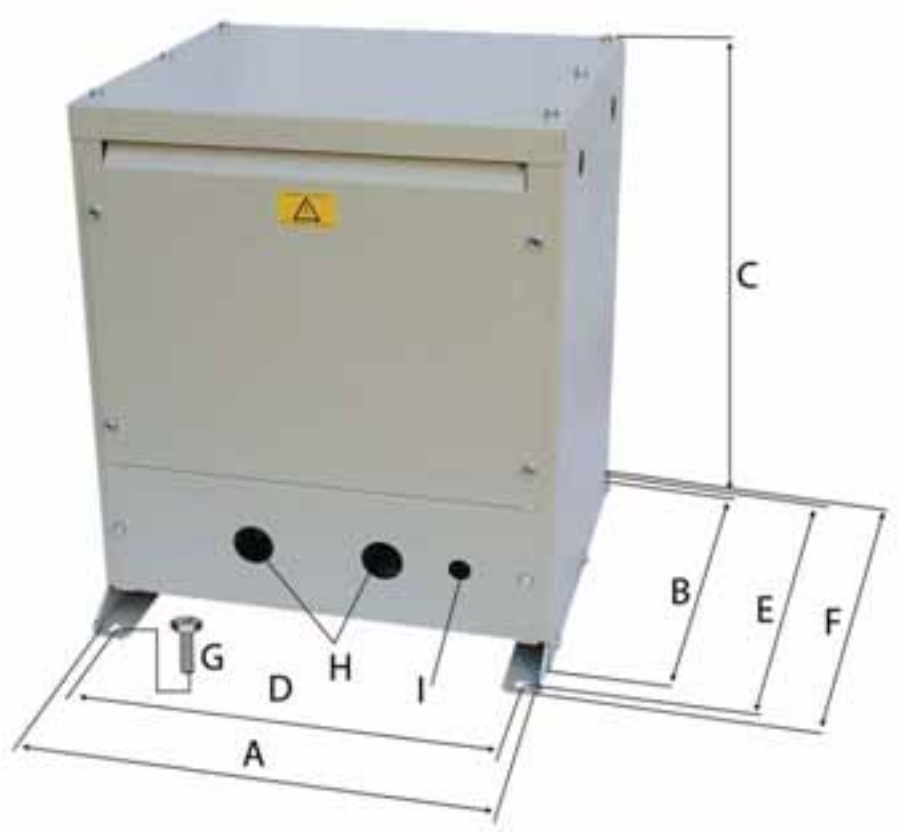
* Option: type series SK2

ESDS0107

Sheet steel enclosure in vertical position for single-phase transformers of the series ES710/3150 to ES710/10000.

Enclosure

- Sheet steel, varnished in RAL 7032
- Degree of protection IP 23
- Bore holes for cable entry
- The enclosures of our transformers (standard version), transformer sizes of 3.15…10 kVA, are provided with fixing holes intended for easy retrofitting at any time.



Ordering information, dimensions (in mm), weight

	A	B	C	D	E	F	G	H	I	Weight	Art. No.
ESDS0107	430	380	500	385	420	450	M10	ø 37.5	ø 20.5	16 kg	B 924 673

Isolating transformer DS0107

Three-phase isolating transformers for the supply of three-phase loads in medical locations

DS0107

Device features

- Built-in temperature sensors acc. to DIN 44081 (120 °C)
- Screen winding with brought-out insulated connection terminal
- Insulated mounting angles
- Degree of protection IP 00 (construction type: open)
- Degree of protection IP 23 (incl. enclosure)
- Protection class I
- Protection class II (option: completely encapsulated version)
- Reinforced insulation
- Classification of insulation ta40/B
- Connections: screw terminals
- Noise level < 35 dB (A)(no-load and nominal load)
- Vector group: Yyn O

Application and description

The transformers of the DS0107 series have reinforced insulation and comply with the requirements of IEC 61558-1 / DIN EN 61558-1 (VDE 0570-1) and IEC 61558-2-15 DIN EN 61558-2-15 (VDE 0570-2-15).

In addition, the transformers comply with the requirements of IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710) for IT systems in medical locations. The windings are galvanically isolated. In order to minimize electrical interferences, an electrostatic screen is installed between the primary and secondary winding the lead out of which is connected to an insulated terminal for connection to the equipotential bonding.

The fixing angles are isolated from the transformer core in order to guarantee an isolated installation to comply with the requirements of DIN VDE 0100-710 (VDE 0100-710): 2002-11, para 710.512.1.6.2).

The transformers are available for horizontal and vertical installation. Protection against corrosion is guaranteed by a complete resin impregnation.

The transformers are designed for use in dry locations. Transformers of the SK2 series are completely encapsulated and fulfil the requirements of protection class II.

Frequency / ratings

The transformers are designed for rated frequencies of 50…60 Hz. The values specified in the chapter “Technical data” refer to a maximum ambient temperature of 40 °C and a rated frequency of 50 Hz.

Temperature rise

Free air circulation must be ensured. An ambient temperature exceeding 40 °C will reduce the rated power. For temperature monitoring, a PTC thermistor is placed on each transformer leg and the leads are connected to the terminals.

Enclosure

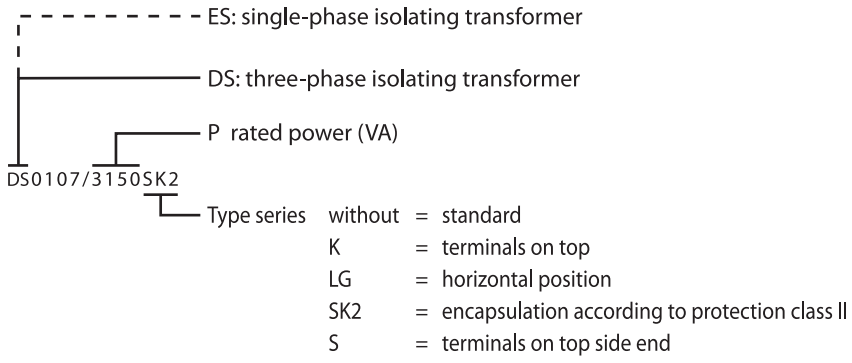
Appropriate steel sheet enclosures, degree of protection IP 23, are available for all standard types of isolating transformers.

Standards

The DS0107 series complies with the requirements of the following standards and regulations for the erection of electrical equipment: IEC 61558-1, DIN EN 61558-1 (VDE 0570-1), IEC 61558-2-15 / DIN EN 61558-2-15 (VDE 0750-2-15), IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710).

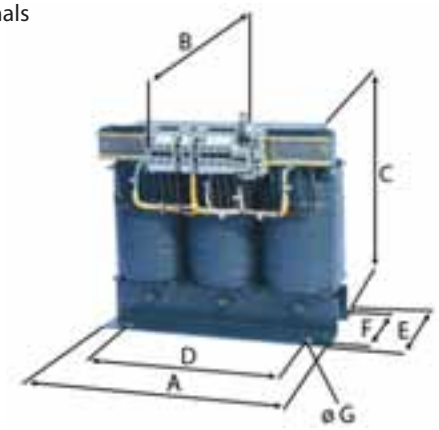
Note:
- According to DIN VDE 0100-710 (VDE 0100-710): 2002-11, para. 710.512.1.6.2, single -phase transformers shall be used for the erection of medical IT systems.
- The transformers of the DS0107 series are not suitable for the erection and installation of medical IT systems.

Nameplate

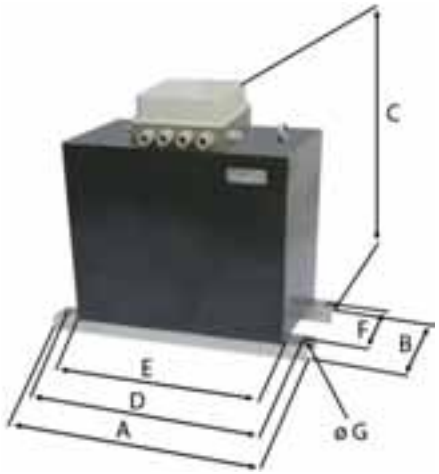

ES: single-phase isolating transformer
DS: three-phase isolating transformer
P rated power (VA)
DS0107/3150SK2
Type series
without = standard
K = terminals on top
LG = horizontal position
SK2 = encapsulation according to protection class II
S = terminals on top side end

Dimension diagram/type of construction

Standard – Dimension B is the depth incl. terminals



SK2 series



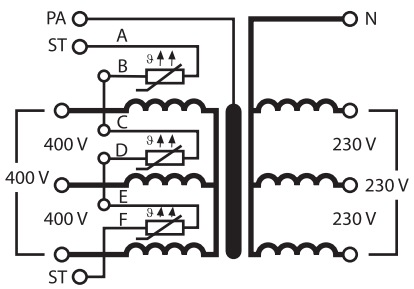
K series
All other dimensions correspond to the standard dimensions.

LG series

Ordering information, dimensions, weights

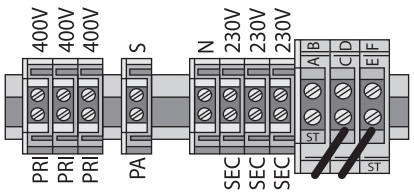
Type	A	B	C	D	E	F	G	Cu weight	Weight	Art. No.
DS107/2000	300 mm	200 mm	270 mm	240 mm	160 mm	130 mm	11 mm	16 kg	34 kg	B 924 694
DS107/3150	360 mm	210 mm	325 mm	310 mm	170 mm	135 mm	11 mm	28 kg	63 kg	B 924 106
DS107/4000	360 mm	225 mm	325 mm	310 mm	185 mm	150 mm	11 mm	29 kg	70 kg	B 924 121
DS107/5000	360 mm	240 mm	325 mm	310 mm	200 mm	165 mm	11 mm	31 kg	77 kg	B 924 112
DS107/6300	420 mm	230 mm	370 mm	370 mm	200 mm	160 mm	11 mm	48 kg	97 kg	B 924 107
DS107/8000	420 mm	245 mm	370 mm	370 mm	215 mm	175 mm	11 mm	51 kg	107 kg	B 924 628
DS107/10000	420 mm	260 mm	370 mm	370 mm	230 mm	190 mm	11 mm	59 kg	130 kg	B 924 672
DS107/2000K	300 mm		310 mm	240 mm	162 mm	130 mm	11 mm	16 kg	34 kg	B 924 687
DS107/3150K	360 mm		360 mm	310 mm	170 mm	135 mm	11 mm	28 kg	63 kg	B 924 688
DS107/4000K	360 mm		360 mm	310 mm	185 mm	150 mm	11 mm	29 kg	70 kg	B 924 689
DS107/5000K	360 mm		360 mm	310 mm	200 mm	165 mm	11 mm	31 kg	77 kg	B 924 690
DS107/6300K	420 mm		420 mm	370 mm	200 mm	160 mm	11 mm	48 kg	97 kg	B 924 691
DS107/8000K	420 mm		420 mm	370 mm	215 mm	175 mm	11 mm	51 kg	107 kg	B 924 692
DS107/10000K	420 mm		420 mm	370 mm	230 mm	190 mm	11 mm	59 kg	130 kg	B 924 693
DS107/2000LG	330 mm	195 mm	265 mm	298 mm		200 mm	7 mm	16 kg	34 kg	B 924 695
DS107/3150LG	394 mm	198 mm	310 mm	358 mm		240 mm	9 mm	28 kg	63 kg	B 924 658
DS107/4000LG	394 mm	214 mm	310 mm	358 mm		240 mm	9 mm	29 kg	70 kg	B 924 659
DS107/5000LG	394 mm	228 mm	310 mm	358 mm		240 mm	9 mm	31 kg	77 kg	B 924 660
DS107/6300LG	452 mm	212 mm	360 mm	408 mm		280 mm	12 mm	48 kg	97 kg	B 924 661
DS107/8000LG	452 mm	227 mm	360 mm	408 mm		280 mm	12 mm	51 kg	107 kg	B 924 662
DS107/10000LG	452 mm	250 mm	360 mm	408 mm		280 mm	12 mm	59 kg	130 kg	B 924 679
DS107/2000SK2	410 mm	190 mm	400 mm	380 mm	330 mm	125 mm	11 mm	16 kg	49 kg	B 924 696
DS107/3150SK2	520 mm	190 mm	450 mm	490 mm	390 mm	135 mm	11 mm	28 kg	75 kg	B 924 122
DS107/4000SK2	520 mm	190 mm	450 mm	490 mm	390 mm	135 mm	11 mm	29 kg	80 kg	B 924 123
DS107/5000SK2	520 mm	200 mm	450 mm	490 mm	390 mm	150 mm	11 mm	31 kg	86 kg	B 924 124
DS107/6300SK2	520 mm	200 mm	500 mm	490 mm	450 mm	150 mm	11 mm	48 kg	107 kg	B 924 125
DS107/8000SK2	520 mm	215 mm	500 mm	490 mm	450 mm	175 mm	11 mm	51 kg	130 kg	B 924 126
DS107/10000SK2	520 mm	230 mm	500 mm	490 mm	450 mm	175 mm	11 mm	59 kg	155 kg	B 924 678

Wiring diagram

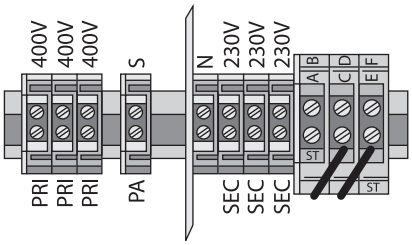


Terminal diagram

Standard,
K series,
LG series



SK2 series



Cross sectional area of connecting cable

Type	Input terminals flexible/rigid	Screen winding flexible/rigid	Control terminals flexible/rigid	Output terminals flexible/rigid
DS0107/2000	10/16 mm²	10/16 mm²	2.5/4 mm²	10/16 mm²
DS0107/3150	10/16 mm²	10/16 mm²	2.5/4 mm²	10/16 mm²
DS0107/4000	10/16 mm²	10/16 mm²	2.5/4 mm²	10/16 mm²
DS0107/5000	10/16 mm²	10/16 mm²	2.5/4 mm²	10/16 mm²
DS0107/6300	10/16 mm²	10/16 mm²	2.5/4 mm²	16/25 mm²
DS0107/8000	10/16 mm²	10/16 mm²	2.5/4 mm²	16/25 mm²
DS0107/10000	16/25 mm²	16/25 mm²	2.5/4 mm²	16/25 mm²

Technical data isolating transformer DS0107

Type	DS0107/2000	DS0107/3150	DS0107/4000	DS0107/5000	DS0107/6300	DS0107/8000	DS0107/10000
Insulation classification	t_a 40/B	t_a 40/B	t_a 40/B	t_a 40/B	t_a 40/B	t_a 40/B	t_a 40/B
Degree of protection	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Protection class	I/II*	I/II*	I/II*	I/II*	I/II*	I/II*	I/II*
Power/ voltages/ currents							
Rated power	2000 VA	3150 VA	4000 VA	5000 VA	6300 VA	8000 VA	10000 VA
Rated frequency	50…60 Hz	50…60 Hz	50…60 Hz	50…60 Hz	50…60 Hz	50…60 Hz	50…60 Hz
Rated input voltage	3AC 400 V	3AC 400 V	3AC 400 V	3AC 400 V	3AC 400 V	3AC 400 V	3AC 400 V
Rated input current	3 A	4.9 A	6.1 A	7.7 A	9.8 A	12.2 A	15.6 A
Rated output voltage	3NAC 230 V	3NAC 230 V	3NAC 230 V	3NAC 230 V	3NAC 230 V	3NAC 230 V	3NAC 230 V
Rated output current	5 A	7.9 A	10 A	12.6 A	15.8 A	20.1 A	25.2 A
Inrush current I_E	< 12 x În	< 12 x În	< 12 x În	< 12 x În	< 12 x În	< 12 x În	< 12 x În
Leakage current	≤ 0.5 mA	≤ 0.5 mA	≤ 0.5 mA	≤ 0.5 mA	≤ 0.5 mA	≤ 0.5 mA	≤ 0.5 mA
No-load input current i_0	≤ 3.0 %	≤ 3.0 %	≤ 3.0 %	≤ 3.0 %	≤ 3.0 %	≤ 3.0 %	≤ 3.0 %
No-load output voltage u_0	≤ 232 V	≤ 235 V	≤ 234 V	≤ 236 V	≤ 236 V	≤ 235 V	≤ 235 V
Short-circuit voltage u_k	≤ 2.9 %	≤ 2.9 %	≤ 2.8 %	≤ 3 %	≤ 2.8 %	≤ 2.8 %	≤ 2.5 %
General data							
Recommended fuse when used in accordance with DIN VDE 0100-710	10 A gL/gG	16 A gL/gG	20 A gL/gG	20 A gL/gG	25 A gL/gG	35 A gL/gG	35 A gL/gG
Induction	1.0 T	0.8 T	0.86 T	0.8 T	0.8 T	0.8 T	0.82 T
$R_{primary}$	1.12 Ω	0.7 Ω	0.42 Ω	0.38 Ω	0.33 Ω	0.26 Ω	0.13 Ω
$R_{secondary}$	0.27 Ω	0.17 Ω	0.13 Ω	0.12 Ω	0.07 Ω	0.055 Ω	0.05 Ω
FE loss (iron loss)	45 W	51 W	70 W	75 W	80 W	96 W	120 W
Cu loss (copper loss)	60 W	105 W	115 W	170 W	200 W	255 W	270 W
Efficiency	95 %	96 %	95 %	95 %	96 %	96 %	96 %
Ambient temperature	≤ 40 °C	≤ 40 °C	≤ 40 °C	≤ 40 °C	≤ 40 °C	≤ 40 °C	≤ 40 °C
No-load temperature rise	≤ 25 °C	≤ 21 °C	≤ 24 °C	≤ 28 °C	≤ 24 °C	≤ 27 °C	≤ 32 °C
Full-load temperature rise	≤ 50 °C	≤ 50 °C	≤ 53 °C	≤ 67 °C	≤ 60 °C	≤ 72 °C	≤ 75 °C
Noise level (no load and full load)	≤ 35 dB(A)	≤ 35 dB(A)	≤ 35 dB(A)	≤ 35 dB(A)	≤ 35 dB(A)	≤ 35 dB(A)	≤ 35 dB(A)

* Option: completely encapsulated version

ESDS0107-1

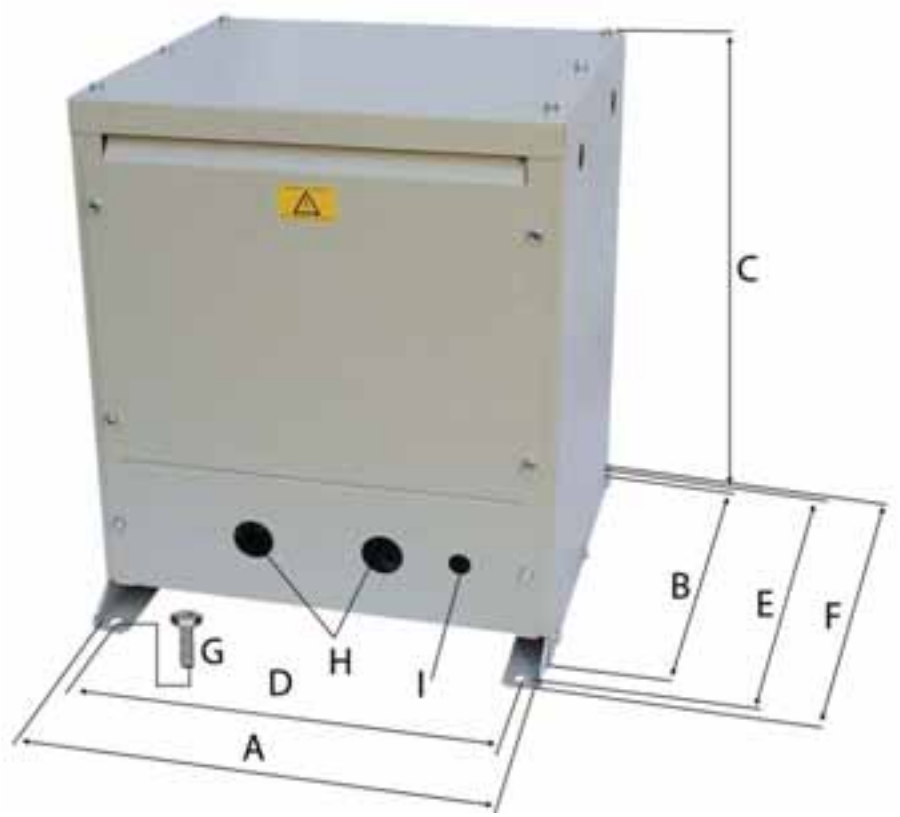
Sheet steel enclosure in vertical position for three-phase transformers DS0107/2000 to DS0107/5000.

ESDS0107-2

Sheet steel enclosure in vertical position for three-phase transformers DS0107/6300 to DS0107/10000.

Enclosure

- Sheet steel, varnished in RAL 7032
- Degree of protection IP 23
- Bore holes for cable entry
- The enclosures of our transformers (standard version), transformer sizes of 2…10 kVA, are provided with fixing holes intended for easy retrofitting at any time.



Ordering information, dimensions (in mm), weight

	A	B	C	D	E	F	G	H	I	Weight	Art. No.
ESDS0107-1	430	380	490	385	420	450	M10	ø 29	ø 21	16 kg	B 924 673
ESDS0107-2	600	420	490	555	460	490	M10	ø 36	ø 16	23 kg	B 924 674

Operating theatre luminaires transformers ESL0107

ESL0107
(operating theatre luminaires transformers)

Device features

- Screen winding lead out for external connection
- Insulated mounting angles
- Degree of protection IP 00 (construction type: open)
- Reinforced insulation
- Classification of insulation ta 40/E
- Connections: screw terminals
- Vector group: IiO

Application and description

The transformers of the ESL0107 series have reinforced insulation and comply with the requirements of IEC 61558-2 -6 / DIN EN 61558-2-6 (VDE 0570-1). The transformers are fitted with tapping points for fine-step voltage adaptation on the primary and secondary side and thus meet the requirements for power supplies of operating theatre luminaires in Group 2 rooms. The windings are galvanically isolated.

In order to minimize electrical interferences, an electrostatic screen is installed between the primary and secondary winding the lead out of which is connected to an insulated terminal for connection to the equipotential bonding.

The fixing angles are isolated from the transformer core in order to ensure isolated installation in accordance with the requirements of the respective standards. Protection against corrosion is guaranteed by a complete resin impregnation. The transformers are designed for use in dry locations.

Frequency / ratings

The transformers are designed for rated frequencies of 50…60 Hz. The values specified in the chapter "Technical data" refer to a maximum ambient temperature of 40 °C and a rated frequency of 50 Hz.

Temperature rise

Free air circulation must be ensured. An ambient temperature exceeding 40 °C will reduce the rated power. The maximum permissible temperature in accordance with insulation class E is 120 °C.

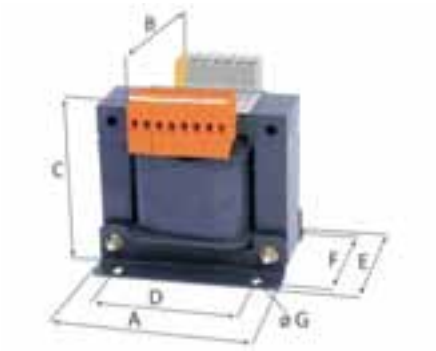
Enclosure

Appropriate steel sheet enclosures, degree of protection IP 23, are available for all standard types of isolating transformers.

Standards

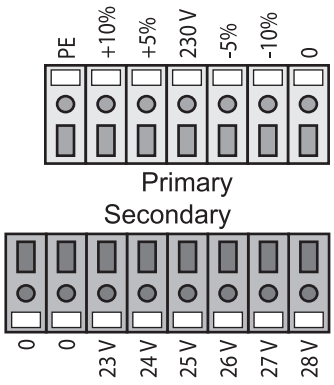
The ESL0107 series complies with the requirements of the following standards and regulations for the erection of electrical equipment: IEC 61558-1 / DIN EN 61558-1 (VDE 0570-1) and IEC 61558-2-6 / DIN EN 61558-2-6 (VDE 0570-2-6).

Dimension diagram



Dimensions

Type	A	B	C	D	E	F	G	Cu weight	Weight
ESL0107 / 120	96 mm	96 mm	105 mm	84 mm	82 mm	65 mm	5.5 mm	0.5 kg	2.3 kg
ESL0107 / 160	96 mm	106 mm	105 mm	84 mm	92 mm	75 mm	5.5 mm	0.8 kg	2.8 kg
ESL0107 / 280	120 mm	102 mm	125 mm	90 mm	92 mm	74 mm	5.5 mm	1 kg	4 kg
ESL0107 / 400	120 mm	134 mm	125 mm	90 mm	128 mm	110 mm	5.5 mm	1.6 kg	6.7 kg
ESL0107 / 630	150 mm	135 mm	150 mm	122 mm	130 mm	108 mm	6.5 mm	3 kg	10.2 kg
ESL0107 / 1000	174 mm	145 mm	175 mm	135 mm	150 mm	120 mm	6.5 mm	5.8 kg	16.5 kg



Connection details/ Terminal diagram

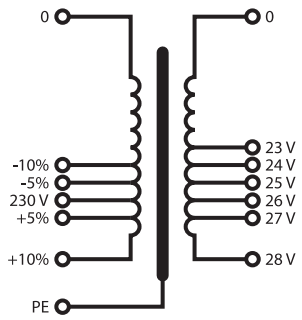
Type	Input terminals flexible/rigid	Screen winding flexible/rigid	Output terminals flexible/rigid
ESL0107/120	4/6 mm²	4/6 mm²	4/6 mm²
ESL0107/160	4/6 mm²	4/6 mm²	4/6 mm²
ESL0107/280	4/6 mm²	4/6 mm²	4/6 mm²
ESL0107/400	4/6 mm²	4/6 mm²	4/6 mm²
ESL0107/630	10/16 mm²	4/6 mm²	10/16 mm²
ESL0107/1000	10/16 mm²	4/6 mm²	10/16 mm²

Technical data operating theatre luminaires transformers ESL0107

Type	ESL0107 / 120	ESL0107 / 160	ESL0107 / 280
Insulation classification	t_a 40/E	t_a 40/E	t_a 40/E
Degree of protection/ protection class	IP 00/I	IP 00/I	IP 00/I
Power/ voltages/ currents			
Rated power	120 VA	160 VA	280 VA
Rated frequency	50…60 Hz	50…60 Hz	50…60 Hz
Rated input voltage	230 V	230 V	230 V
Rated input current	0.6 A	0.8 A	1.4 A
Rated output voltage	23…28 V	23…28 V	23…28 V
Rated output current	4.3 A	5.7 A	10 A
Inrush current I_E	< 15 x In	< 15 x In	< 15 x In
Leakage current	≤ 5 µA	≤ 5 µA	≤ 5 µA
No-load input current i_0	≤ 95 mA	≤ 120 mA	≤ 140 mA
No-load output voltage u_0	≤ 31.7 V	≤ 30.7 V	≤ 30.6 V
Short-circuit voltage u_k	≤ 11 %	≤ 8.8 %	≤ 7.9 %
General data			
Recommended fuse when used in accordance with DIN VDE 0100-710	6 A gL/gG	6 A gL/gG	6 A gL/gG
Induction	1.23 T	1.17 T	1.14 T
$R_{primary}$	15.3 Ω	8.9 Ω	4.7 Ω
$R_{secondary}$	0.32 Ω	0.2 Ω	0.095 Ω
FE loss (iron loss)	5.5 W	6.3 W	9 W
Cu loss (copper loss)	15.8 W	16 W	25 W
Efficiency	85 %	88 %	89 %
Ambient temperature	40 °C	40 °C	40 °C
No-load temperature rise	≤ 17 °C	≤ 20 °C	≤ 18 °C
Nominal load temperature rise	≤ 66 °C	≤ 64 °C	≤ 71 °C
Noise level (no load and nominal load)	≤ 35 dB(A)	≤ 35 dB(A)	≤ 35 dB(A)

Type	ESL0107/400	ESL0107/630	ESL0107/1000
Insulation classification	t_a 40/E	t_a 40/E	t_a 40/E
Degree of protection/ protection class	IP 00/I	IP 00/I	IP 00/I
Power/voltages/currents			
Rated power	400 VA	630 VA	1000 VA
Rated frequency	50…60 Hz	50…60 Hz	50…60 Hz
Rated input voltage	230 V	230 V	230 V
Rated input current	1.9 A	3 A	4.6 A
Rated output voltage	23…28 V	23…28 V	23…28 V
Rated output current	14.3 A	22.5 A	35.7 A
Inrush current I_E	< 15 x In	< 15 x In	< 15 x In
Leakage current	≤ 5 µA	≤ 5 µA	≤ 5 µA
No-load input current i_0	≤ 237 mA	≤ 270 mA	≤ 320 mA
No-load output voltage u_0	≤ 29.7 V	≤ 30 V	≤ 30 V
Short-circuit voltage u_k	≤ 5.3 %	≤ 5 %	≤ 4.3 %
General data			
Recommended fuse when used in accordance with DIN VDE 0100-710	10 A gL/gG	16 A gL/gG	16 A gL/gG
Induction	1.14 T	1.06 T	1 T
$R_{primary}$	2 Ω	1,2 Ω	0.6 Ω
$R_{secondary}$	0.05 Ω	0.028 Ω	0.016 Ω
FE loss (iron loss)	15 W	18 W	26 W
Cu loss (copper loss)	23 W	33 W	44 W
Efficiency	91 %	92 %	94 %
Ambient temperature	40 °C	40 °C	40 °C
No-load temperature rise	≤ 26 °C	≤ 23 °C	≤ 26 °C
Nominal load temperature rise	≤ 62 °C	≤ 64 °C	≤ 65 °C
Noise level (no load and nominal load)	≤ 35 dB(A)	≤ 35 dB(A)	≤ 35 dB(A)

Wiring diagram



Ordering information

Type	Art. No.
ESL0107 / 120	B 924 632
ESL0107 / 160	B 924 633
ESL0107 / 280	B 924 634
ESL0107 / 400	B 924 637
ESL0107 / 630	B 924 638
ESL0107 / 1000	B 924 639

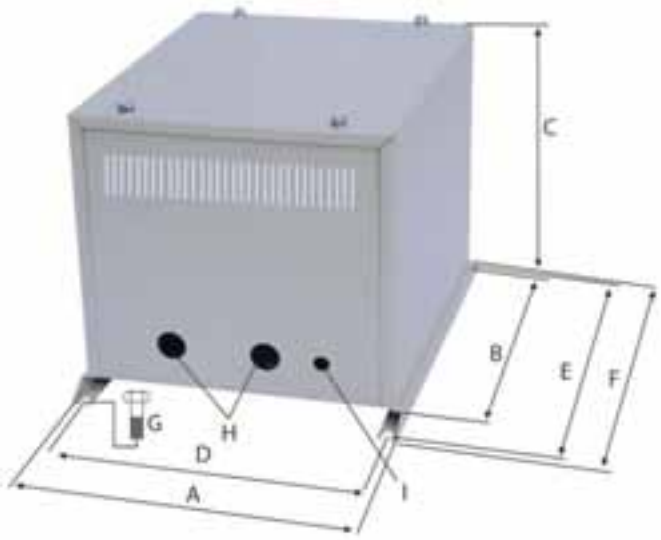
Isolating transformer enclosure

ESL0107-0

Sheet-steel enclosure for wall mounting for operating theatre luminaires transformers ESL0107/120 to ESL0107/1000.

Enclosure

- Sheet steel, varnished in RAL 7032
- Degree of protection IP 23
- Bore holes for cable entry
- Transformers of the sizes 120 bis 1000 VA are already provided with fixing holes and can easily be retrofitted to other systems at any time.



Dimensions of the enclosure in mm

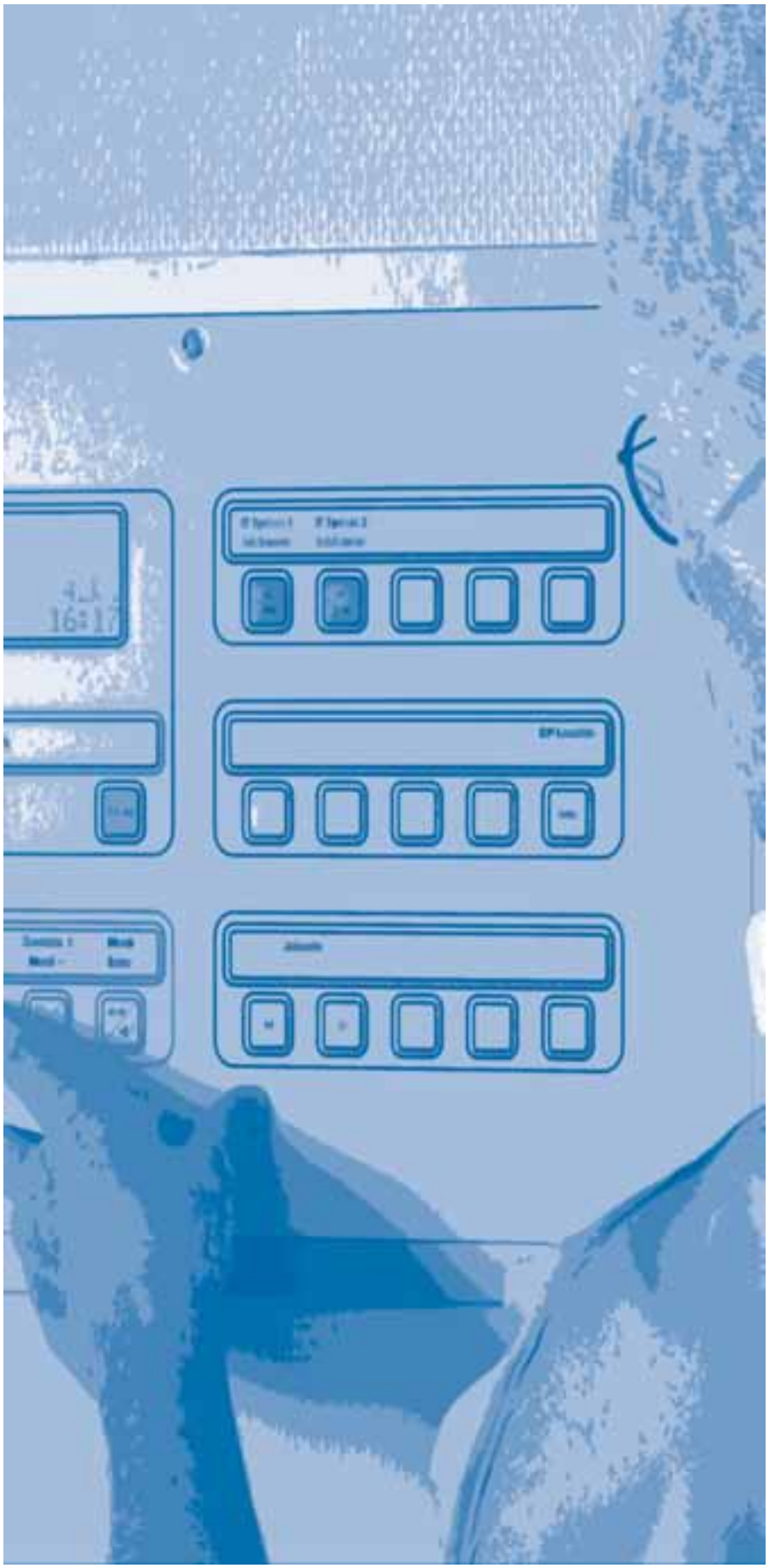
	A	B	C	D	E	F	G	H	I	Weight	Art. No.
ESL0107-0	240	280	220	220	300	320	M6	ø 29	ø 21	3.5 kg	B 924 204

2.3

Indication and operation

Remote alarm indicator and test combination

Chapter 2.4



Remote alarm indicator and test combinations for medical locations, nurses rooms, porter's offices, central monitoring rooms, central fire alarm systems and many more.

Alarm indicator and operator panels acc. to IEC 60364-7-710:2002-11 para. 710.413.1.5 and DIN VDE 0100-710:2002-11 para 710.413.1.5 “Medical IT system” and IEC 60364-7-710:2002-11 para. 710.5.3 and DIN VDE 0100-710:2002-11 para. 710.413.5 “Switzgear and controlgear”.

2.4.1

Remote alarm indicator and test combination MK2430

MK2430

Device features

- Display of operating and alarm messages according to IEC 60364-7-710 / DIN VDE 0100-710 and other standards
- Backlit clear LC text display (4 x 20 characters)
- Predefined standard texts in 20 languages
- 200 freely programmable message texts
- Bus technology for easy installation and reduced fire load
- Acoustic alarm with mute function
- Parameter setting via menu (German/English)
- Suitable for flush and surface mounting
- Easy commissioning due to predefined message texts
- 12 digital inputs (MK2430-11 only)
- Memory with real-time clock to store 250 alarm messages with date and time stamp
- MK2418 can easily be exchanged for MK2430

Approvals

AE25

Product description

The universal remote alarm indicator and test combination MK2430 is intended for visual and audible indication of operating status and alarm messages from Bender systems such as EDS, RCMS and MEDICS. In MEDICS monitoring systems, the MK2430 meets the requirements of IEC 60364-7-710 in respect of test functions for IT system monitoring and messages from changeover modules.

The IT system monitoring equipment can be tested using the programmable “test” button.

Important display functions:

- Normal operation (green LED)
- Insulation fault
- Overload
- Overtemperature
- Messages from insulation fault location systems (EDS) and residual current monitoring systems (RCMS)
- Supply line failure
- Interruption of the phase conductor or PE conductor of the A-ISOMETER®
- Power supply fault conditions and changeover system faults
- Device failure
- Test results
- Measured values

The LC text display makes this information easy to understand. The connection between the MKs and the changeover and monitoring modules is implemented with bus technology. During normal operation, the MK2430 indicates the readiness for operation of the system. The MK2430-11 features 12 digital inputs allowing messages from other technical equipment to be recorded and displayed on the MK2430, for example from medical gases or UPS systems.

Function

On its backlit LC display (4 x 20 characters), the MK2430 displays messages from all BMS bus devices assigned via alarm addresses. As well as being used as a standalone indicator, the MK2430 also supports parallel operation. In the event of an alarm message, the yellow “WARNING“ LED or the red “ALARM” LED lights up and the message appears on the LC display in plain text format. At the same time there is an audible signal (acknowledgeable). If a second message is received whilst the first is still pending, the audible signal will sound again and the messages will flash up alternately on the LC display. The address of the device triggering the alarm can also be called up. The audible signal sounds again once a configurable period of time has elapsed.

Internal device parameters (alarm addresses, test addresses,…) and the parameter setting for EDS and RCM systems can be accessed via the menu system.

As a master, the MK2430 can also be used in installations with a number of IT and EDS systems.

The test button can be used to check the operation of an A-ISOMETER® 107TD47 or IRDH. A message is only output on the MK2430 on which the test button was pressed.

When wiring the bus connection, please note that a 4-wire cable (2 x BUS, 2 x U_S) with a suitable cross section is required when the supply voltage is incorporated in the cable.

Display/operating elements

The backlit display features four lines of 20 characters. It supplies medical and technical personnel with information that is always clear and unambigous, in order to help them to make decisions. Every alarm message comprises three lines which appear spontaneously and three additional lines which can be displayed at the touch of a button. The 4th line contains status information (number of messages, test procedures, menu information). Three LEDs are located above the text display. They indicate: normal operation (green), warnings (yellow) or alarms (red). Five keys are available for acknowledging alarms and warnings, and for the menu system.

Programming

Standard message texts can be activated by enabling alarm addresses. These standard message texts are available in 20 languages. Alarm addresses can be activated via the device menu system (without PC). Individual message texts, each comprising 6 lines of 20 characters, can be programmed with the MK-Set PC software. An LED (yellow or red) and an audible signal can be assigned to each message. For this purpose, the PC is connected to the USB interface or BMS bus (RS-485) via converter.

History memory

Warning and alarm messages are written to the history memory automatically with date and time stamp. 250 text messages can be saved; the history memory can be read out via the operating menu or the Medi-History PC software.

MK2430-12

The MK2430-12 is used for visual and audible indication of alarms from Bender's EDS, RCMS and MEDICS systems and to trigger the ISOMETER® test function via the BMS bus. Furthermore, the MK2430-12 can also be used with older changeover devices in conjunction with SMI470-9 or as a parallel display in conjunction with MK2430-11 or SMI472-12. The programmed message texts are displayed on the LCD in the selected language.

MK2430-11

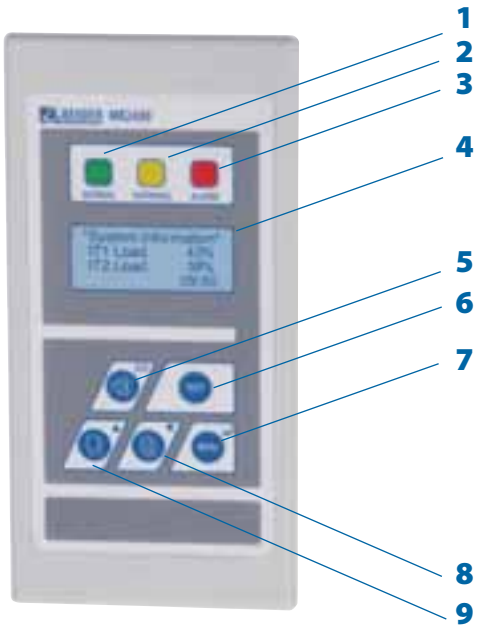
The MK2430-11 features all the functions of the MK2430-12, plus 12 digital inputs. These digital inputs (IN1… IN12) are controlled via potential-free contacts (N/C, N/O operation configurable). Any message text can be assigned to the inputs.

MK2430P-…

The MK2430P-… contains the programming of the standard display and the factory activation of up 20 alarm addresses.

A line containing a note about the associated equipment can be programmed individually for each alarm address. This line appears as the first line in an alarm mesage, the message itself is displayed together with the standard text (line 2, 3, 5, 6, 7) (see example a). For many applications with medical IT systems, this programming scope is sufficient. A programming template in the shape of a form is available for customer-specific programming.
Furthermore, up to 200 individual alarms can be programmed in the factory subject to an additional fee (see example b). This type of programming is recommended for EDS, RCMS, medical gases or UPS systems.

Operating and display elements



1 - LED “NORMAL”: operation indicator
2 - LED “WARNING”: Warning messages
3 - LED “ALARM”: Alarm messages
4 - LCD: Display of operating and alarm messages
5 - “Mute” button
In operating mode: to mute the buzzer
In menu mode: Esc function
6 - Test button “TEST”:
To activate the test for connected and assigned insulation monitoring devices
7 - “Menu” button:
In operating mode: to call up the menu mode
In menu mode: Enter function.
8 - “Additional text” button:
In operating mode:
In menu mode: Down key
9 - “Scroll” button:
In operating mode: to scroll messages
In menu mode: Up key

Typical alarm messages:

a) Standard text

Information about the assigned system
Standard alarm text (lines 2…3)
Status line

```
System              02
Insulation fault
Meas. Value      30kΩ
01/03            14:45
```

Standard additional text (lines 5…7)
Status line

```
since 11.03.05   14:36
Device        ISOMETER
Addr/Ch          003/03
01/03            14:45
```

b) Individually programmed alarm text

Individual alarm text (lines 1…3)
Status line

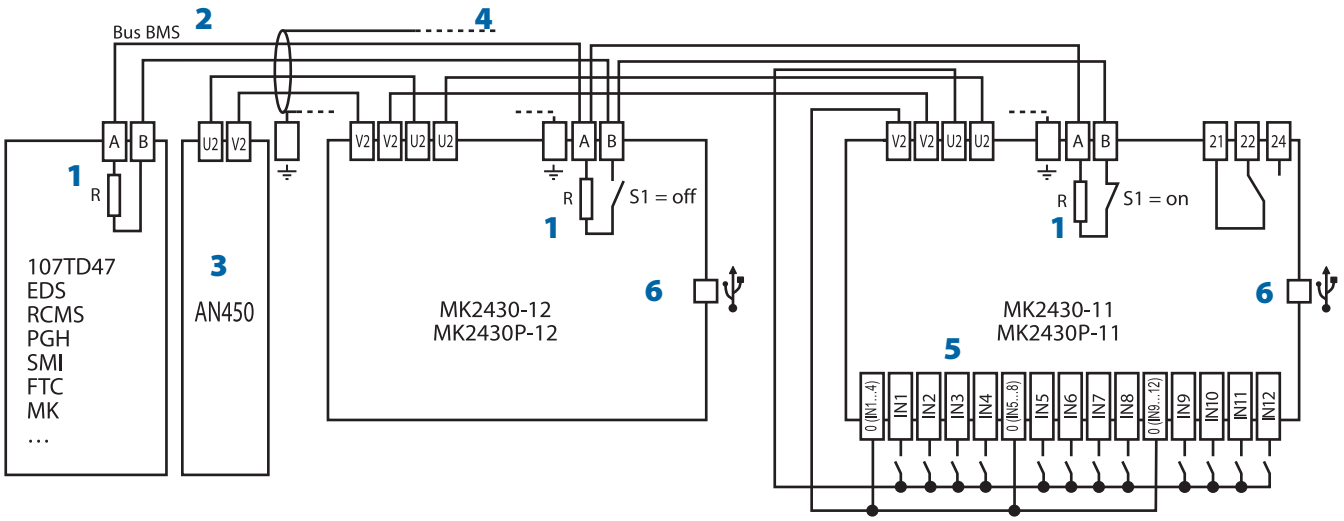
```
Intensive care unit H034
Current            700µA
Socket          IT7-F305
02/03            14:45
```

Individual alarm text (lines 5…7)
Status line

```
since 11.03.05   14:37
Room: E107          UV7
EDS474           003/03
02/03            14:45
```

2.4.1

Wiring diagram



1 - Terminating resistor BMS bus (120 Ω)

2 - Connection BMS bus

3 - Power supply unit incorporated in the MEDICS® module, sufficient for supplying power to at least three MK2430.

4 - Wiring between the MEDICS® module and MK2430

When the MK2430 is supplied by the AN450 power supply unit incorporated in MEDICS® modules, the permissible cable lengths and cable cross sections have to be considered

5 - Digital inputs

The digital inputs may be controlled either via potential-free contacts or via voltage signals. If you are using potential-free contacts, the voltage can be drawn from the AN450 (3).

If the inputs are controlled via an external voltage, the common 0(-) is applied to terminal 0 and the 1(+)-signal to the relevant input IN1…IN12. In this case, the connections between the terminals 0 and V2 and the common connections and U2 are not required.

6 - USB connection for programming

2.4.1

Ordering information

	Digital inputs	Factory programmed alarm texts	BMS bus	Enclosure	Art. No
MK2430-11	×	--	×	for flush-mounting	B 9510 0001
MK2430A-11	×	--	×	for surface-mounting	B 9510 0005
MK2430-12	--	--	×	for flush-mounting	B 9510 0002
MK2430A-12	--	--	×	for surface mounting	B 9510 0006
MK2430P-11	×	×	×	for flush-mounting	B 9510 0003
MK2430PA-11	×	×	×	for surface-mounting	B 9510 0007
MK2430P-12	--	×	×	for flush-mounting	B 9510 0004
MK2430PA-12	--	×	×	for surface mounting	B 9510 0008
MK2430S-11	×	--	×	flush-mounting by means of screws	B 9510 0011
MK2430S-12	--	--	×	flush-mounting by means of screws	B 9510 0012

TMK-SET (Accessory: Software for parameter setting, in the download area of the Internet)

Accessories

	Art. No.
MK24…-Cavity wall mounting kit	B 923 711
MK24…-Panel mounting kit	B 923 780
MK2430-mounting kit, complete	B 9510 1000

Technical data remote alarm indicator and test combination MK2430

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Supply voltage

Supply voltage U_S	AC / DC 24 V
Frequency range U_S	DC 40…60 Hz
Operating range U_S	AC 18…28/DC 18…30 V
Power consumption	≤ 3 VA
Voltage failure without reset	≥ 15 s

Displays and LEDs

Display, characters	four lines, 4 x 20 characters
Standard message texts in	20 languages
Alarm addresses	≤ 150
Programmable text messages	200
History memory (messages)	250
Standard text message	3 x 20 characters
Additional text message (accessed via key)	3 x 20 characters
Alarm LEDs (three different colours)	NORMAL (green), WARNING (yellow), ALARM (red)
Menu texts	German/ English
Keys	5 (Isometer test, buzzer mute, additional text, scroll, menu)

Buzzer

Buzzer message	can be acknowledged, adoption of characteristics of new values
Buzzer interval	configurable
Buzzer frequency	configurable
Buzzer repetition	configurable

Inputs (MK2430…-11 only)

Digital inputs	12 (IN1…IN12)
Galvanic separation	yes
Control of digital inputs	via voltage-free contacts/ extraneous voltage
Operating	principle N/O or N/C operation can be selected for each input
Factory setting	N/O operation
Voltage range (high)	AC / DC 10…30 V
Voltage range (low)	AC / DC 0…2 V

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kbit / s
Cable length	< 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W) via DIP switch connectable
Device address, BMS bus	DIP switch 1…150
Factory setting device address	1 (Master)

Programming

Interfaces	RS-485 or USB
Software	TMK-SET V 3.0 (V2.0/V1.1) or higher
Factory setting password query	activated

Cable length when the power supply for 1/2/3 MK2430 is taken from one AN450

0.28 mm²	60/40/-- m
0.5 mm²	250/70/-- m
0.75 mm²	400/100/-- m
1.5 mm²	800/210/10 m
2.5 mm²	1300/360/20 m

Colours

Front foil	RAL 7035 (light grey) / RAL 7012 (basalt grey)
Marking	buttons: RAL 5002 (ultramarine blue) RAL 7035 (light grey)
Front plate	RAL 7035 (light grey)

Switching elements

Number of changeover contacts	one (MK2430-11 only)		
Function	programmable		
Operating principle	N/C or N/O operation (programmable)		
Electrical service life under rated operating conditions, number of cycles	10.000		
Contact data acc. to IEC 60947-5-1			
Utilization category	AC-13	AC-14	DC-12
Rated operational voltage	24 V	24 V	24 V
Rated operational current	5 A	3 A	1 A
Minimum contact load	1 mA at AC / DC 10 V		

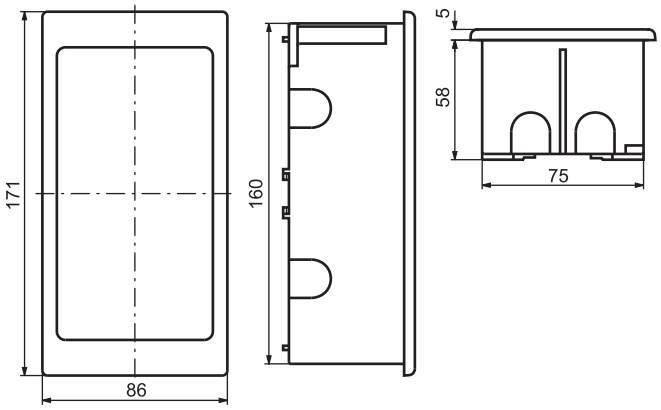
General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-3
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Long-time storage	1K4
Operating temperature	-5 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M2
Long-time storage	1M3
Operating mode	continuous operation
Mounting	any position
Connection type	plug-in terminals
Connection properties (supply voltage, BMS bus)	
rigid / flexible / conductor sizes	0.2…2.5/0.2…2.5 mm²/AWG 24-12
flexible with ferrule without/with plastic sleeve	0.25…2.5/0.25…2.5 mm²
Connection properties (inputs)	
rigid / flexible / conductor sizes	0.08…1.5/0.08…1.5 mm²/AWG 28-16
flexible with ferrule without / with plastic sleeve	0.25…1.5/0.25…0.5 mm²
Stripping length	7 mm
Tightening torque	0.5…0.6 Nm
Degree of protection, internal components (DIN EN 60529)	IP 50 (surface-mounting type IP 54)
Degree of protection, terminals (IEC 60529)	IP 20
Flammability class	UL94V-0
Product standards	IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)
Operating manual	TGH1389
Weight	flush-mounting ≤ 210 g, surface-mounting ≤ 400 g

2.4.1

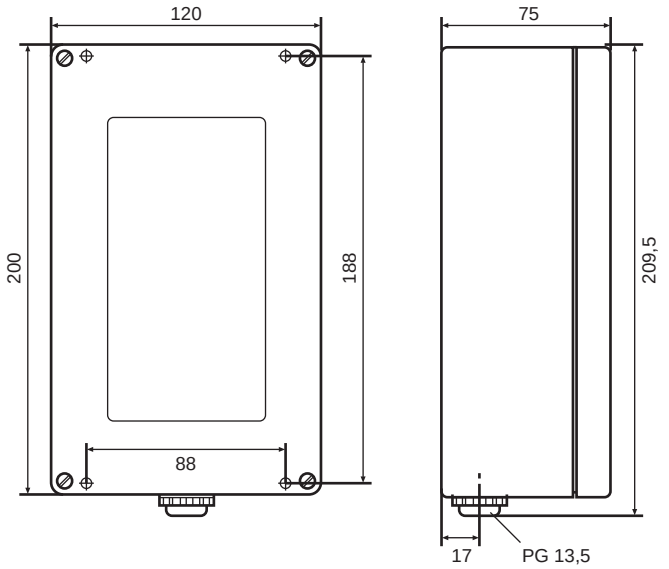
Dimension diagram flush-mounting type

Dimensions in mm



Dimension diagram surface-mounting type

Dimensions in mm



2.4.1

Remote alarm indicator and test combination MK800

Remote alarm indicator and test combination for Bender monitoring systems with BMS bus capability

MK800-… with surface-mounting enclosure

Device features

- Display of operating status and alarm messages from Bender monitoring systems
- Backlit clear LC text display (4 x 20 characters, 8 mm)
- Additional text to be displayed, if required.
- A set of LEDs, red, yellow and green, allowing messages to be indicated in an order of priority
- 80 predefined standard texts in 20 languages
- 1000 freely programmable message texts
- Easy parameter setting with PC (USB interface) or menu
- Memory with real-time clock to store 1000 alarm messages with date and time stamp
- 16 digital inputs (option)
- 1 programmable relay (option)
- Five large function keys
- Versions available for flush and surface mounting as well as for mounting into cavity walls or for door mounting
- Non-reflecting, multicoloured foil
- Smooth surfaces without openings to meet the hygiene requirements for medical locations

Approvals

Product description

The universal MK800 remote alarm indicator and test combination is used for

- indication and visualization of operating status and alarm messages;
- central operation and parameter setting of BMS bus devices;
- indication and visualization of operating status and alarm messages;
- displaying measured values and setting of response values for monitoring purposes

from Bender monitoring systems with BMS-bus capability, such as MEDICS, RCMS or EDS. The MK800 is available for flush and surface mounting. The flush-mounting version is suitable for cavity wall or door mounting. The appropriate cover frames are available in different colours.

Function

On its backlit display, the MK800 displays messages from all BMS-bus devices assigned via alarm addresses. As well as being used as a standalone indicator, the MK800 also supports parallel indication. In the event of an alarm message, the yellow “WARNING“ LED or the red “ALARM" LED lights up and the message appears on the LC display in plain text format. At the touch of the “ ⧉ “ button, three additional text lines can be displayed to each alarm message (for example, instructions what to do). At the same time, there is an audible signal the frequency and interval of which can be set accordingly to distinguish different alarms. The audible alarm is acknowledgeable and sounds again once a configurable period of time has elapsed. If a second message is received whilst the first is still pending, the audible signal will sound again and the messages will flash up alternately on the LC display.

The MK800 provides a test button to check the operation of an assigned A-ISOMETER® 107TD47 or IRDH. The test is carried out sequentially and evaluated automatically. A message is indicated only on that MK800 the test button of which was pressed - in this way other areas will not be disturbed.

The MK800 can be used as a master device in all BMS systems.

Display/operating elements

The MK800 backlit LC text display features four lines of 20 characters (8 mm high). It supplies medical and technical personnel with information that is always clear and unambiguous, in order to help them to make decisions. Every alarm message comprises three lines which appear spontaneously and three additional lines which can be displayed at the touch of a button. This additional text provides further information, e.g. instructions what to do in this case of fault. The fourth line contains status information, such as number of messages, test procedures or menu information.

Three LEDs in different colours are located below the text display which allow massages to be visually indicated in an order of priority.

Five illuminated large keys are available for operating the MK800. These keys provide the following functions:

- Acknowledgement of acoustic alarms
- Functional test of assigned ISOMETER®
- Lamp test
- Scrolling alarm textes and messages
- MK800 parameter setting

Parameter setting

The memory of the MK800 provides 80 predefined alarm texts in 20 languages, therefore parameters can be easily set via the function keys of the MK800. That means, a personal computer is not required for commissioning.

The intuitive, user-friendly TMK-Set PC software also allows individual texts to be programmed and assigned to 1000 individual messages via USB interface or the external BMS bus. A warning or alarm LED as well as an acoustic signal can be assigned to each message.

History memory

Warning and alarm messages with date and time stamp are automatically stored in the memory as well as analogue values with maximum and minimum values. This guarantees reproducibility at all times. Up to 1000 messages are stored. The data of the history memory can be displayed directly on the MK800.

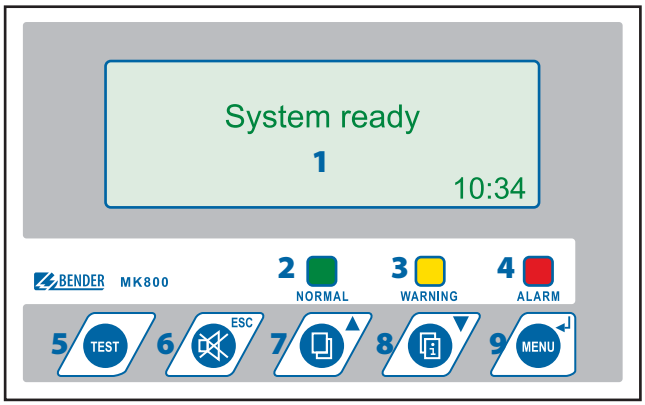
The history memory can be read out via the TMK-History software which also provides clear data analysis.

Digital inputs/ relay output (option MK800-11)

16 digital inputs are available allowing messages from third-party systems to be displayed. The digital inputs are designed for voltages of AC/DC 0…30 V, in practice these inputs are controlled by potential-free contacts. The logic of these inputs can be set as required.

For test functions or common alarms, a programmable relay is available.

Operating and display elements



1 - LCD: Display of operating, warning and alarm messages

2 - LED “NORMAL“: operation indicator

3 - LED “WARNING“: Warning messages

4 - LED “ALARM“: Alarm messages

5 - Test button “TEST”: to activate the test for connected and assigned insulation monitoring devices.

6 - Buzzer “mute”: In operating mode: to mute the buzzer. In menu mode: Esc function

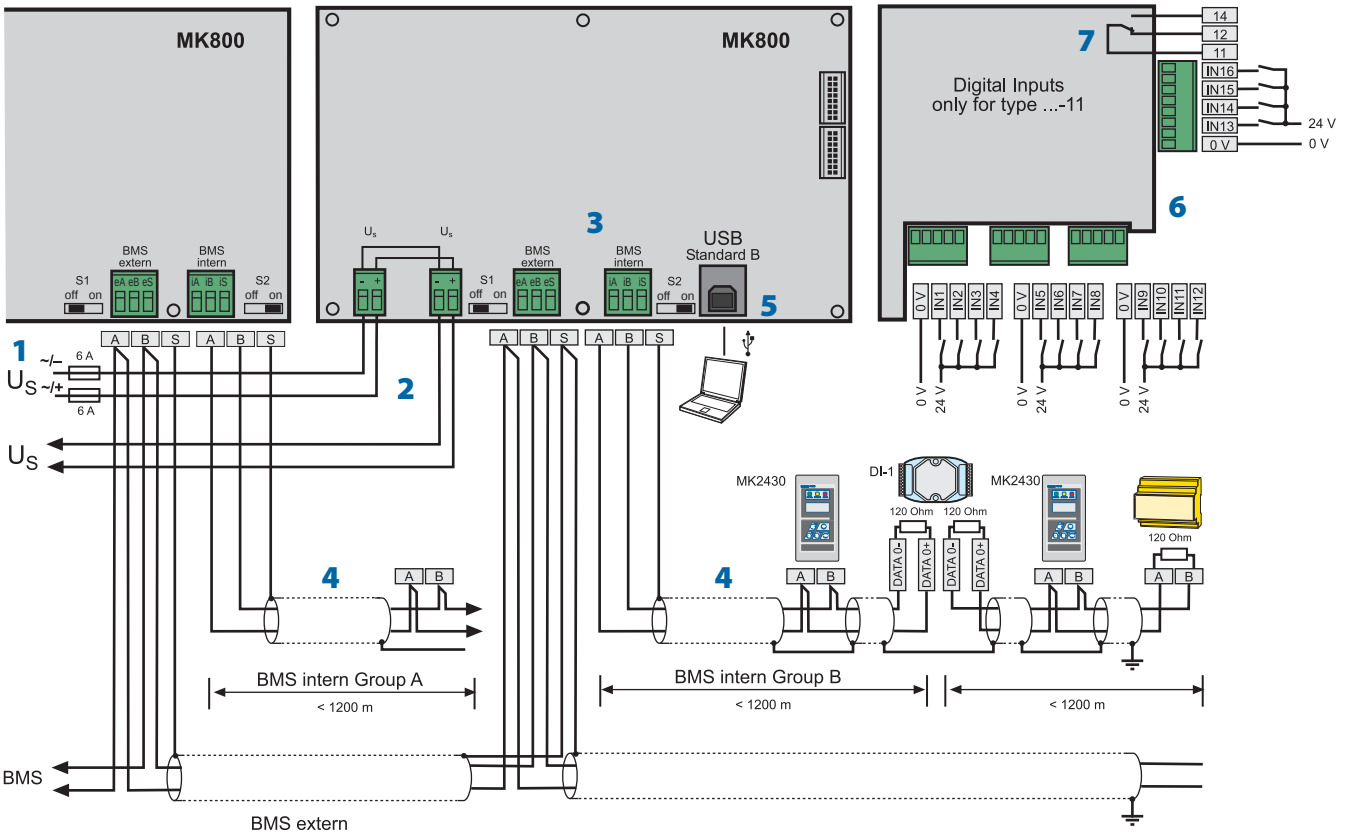
7 - “Scroll key”: In operating mode: to scroll messages. In menu mode: Up key

8 - “Add. text" key: In operating mode: additional text In menu mode: Down key

9 - “MENU” key: In operating mode: to call up the menu mode. In menu mode: Enter function.

2.4.1

Wiring diagram



1 - Supply voltage U_S

2 - Looped through connection for supply voltage (e.g. for control voltage, relay contacts)

3 - Switches S1, S2 for BMS bus termination (terminating resistor 120 Ω)

4 - Wiring between the MK800 and devices with BMS-bus capability

5 - USB connection for programming

6 - Digital inputs
The digital inputs either have to be activated via potential free contacts or via voltage signals.

When the inputs are activated via an external voltage, the common 0(-) is connected to terminal 0 and the 1(+)-signal is connected to the respective input IN1…IN16.

7 - Programmable contact for device errors, ISOMETER® test, device failure, common alarm message.

Technical data alarm indicator and test combination MK800

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Supply voltage

Supply voltage U_S	AC / DC 24 V
Frequency range U_S	0/40…60 Hz
Operating range U_S	AC 18…28/DC 18…30 V
Power consumption	≤ 5 VA

Displays and LEDs

Display, characters, four lines	4 x 20 characters
Standard message texts in	20 languages
Alarm addresses	< 300
Programmable text messages	1000
History memory (messages)	1000
Standard text message	3 x 20 characters
Additional text message (accessed via key)	3 x 20 characters
Alarm LEDs (three different colours)	NORMAL (green) WARNING (yellow) ALARM (red)
Menu texts	German/ English
Keys	5 (Isometer test, buzzer mute, additional text, scroll, menu)

Buzzer

Buzzer message	can be acknowledged, adoption of characteristics of new values
Buzzer interval	configurable
Buzzer frequency	configurable
Buzzer repetition	configurable

Inputs (option) (MK800-11 only)

Digital inputs	16 (IN1…IN16)
Galvanic separation	yes
Control of digital inputs via potential-free contacts/extraneous voltage	
Operating principle N/O or N/C operation / Off	can be selected for each input
Factory setting	Off
Voltage range (high)	AC / DC 10…30 V
Voltage range (low)	AC / DC 0…2 V

Interface internal/external

Interface/protocol	2 x RS-485/BMS
Baud rate internal/external (default setting)	9.6 kBit/s/57.6 kbit/s
Cable length	≤1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W) can be connected via DIP
Device address, BMS bus internal/external	1(…150)/1…99
Factory setting device address internal/external	1 (master)/1 (master)

Programming

Interfaces	RS-485 / BMS / USB
Software TMK-Set	V 3.0 and higher
Factory setting password query	activated

Cable length when the power supply for the MK800 is taken from AN450

0.28 mm²	50 m
0.5 mm²	90 m
0.75 mm²	150 m
1.5 mm²	250 m
2.5 mm²	400 m

Colours

Front foil	RAL 7035 (light grey) / RAL 7012 (basalt grey)
Marking keys	RAL 5002 (ultramarine blue): RAL 7035 (light grey)
Front plate	RAL 7035 (light grey)

Switching elements

Number of changeover contacts			1 (MK800-11 only)
Operating principle			N/C or N/O operation (programmable)
Electrical service life, number of cycles			10.000
Contact data acc. to IEC 60947-5-1			
Utilization category	AC-13	AC-14	DC-12
Rated operational voltage	24 V	24 V	24 V
Rated operational current	5 A	3 A	1 A
Minimum contact load			1 mA at AC / DC > 10 V

General data

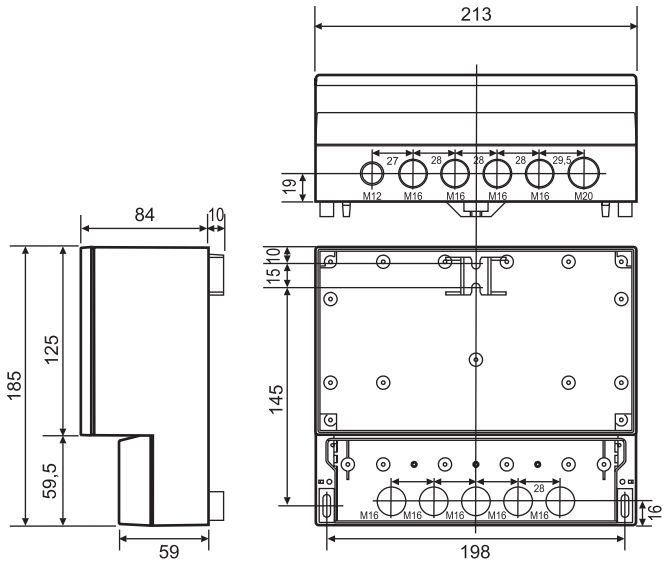
EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Operating temperature	- 5…+ 55 °C
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Storage	1K4
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M2
Long-time storage	1M3
Operating mode	continuous operation
Mounting	any position
Connection	plug-in terminals
Connection properties (supply voltage, BMS bus)	
rigid / flexible / conductor sizes	0.2…2.5/0.2…2.5 mm²/AWG 24-12
flexible with ferrule without/with plastic sleeve	0.25…2.5/0.25…2.5 mm²
Connection properties (inputs)	
rigid / flexible / conductor sizes	0.08…1.5/0.08…1.5 mm²/AWG 28-16
flexible with ferrule without / with plastic sleeve	0.25…1.5/0.25…0.5 mm²
Stripping length	7 mm
Tightening torque	0.5…0.6 Nm
Degree of protection, internal components (DIN EN 60529)	IP50
Degree of protection, terminals (IEC 60529)	IP20
Flammability class	UL94V-0
Product standards	IEC 60364-7-710
Operating manual	TGH1408
Weight	
Flush-mounting (MK800)	< 950 g
Surface-mounting (MK800A)	< 880 g
Surface-mounting (MK800AF)	< 1150 g

2.4.1

Ordering information			
Type	**Digital inputs**	**Enclosure**	**Art. No.**
MK800-11	16	Flush-mounting	B 9510 0100
MK800-12	--	Flush-mounting	B 9510 0101
MK800A-11	16	Surface mounting	B 9510 0102
MK800A-12	--	Surface mounting	B 9510 0103
MK800AF-11	16	Surface mounting, front door	B 9510 0104
MK800AF-12	--	Surface mounting, front door	B 9510 0105
MK800E-11	16	Built-in type without enclosure	B 9510 0106
MK800E-12	--	Built-in type without enclosure	B 9510 0107
UP800	--	Flush-mounting for MK800	B 9510 0110
BR800-1	--	Bezel frame silver for MK800	B 9510 0111
BR800-2	--	Bezel frame white for MK800	B 9510 0112
TMK-Set V3.xx	software	Download or CD version	B 9602 0087

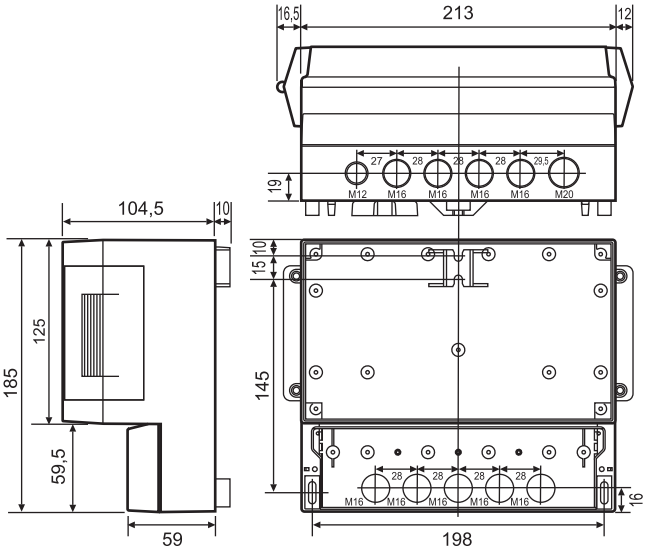
Dimension diagram MK800A-11/MK800A-12, surface-mounting type

Dimensions are given in mm



Dimension diagram MK800AF-11/MK800AF-12, surface-mounting type, front door

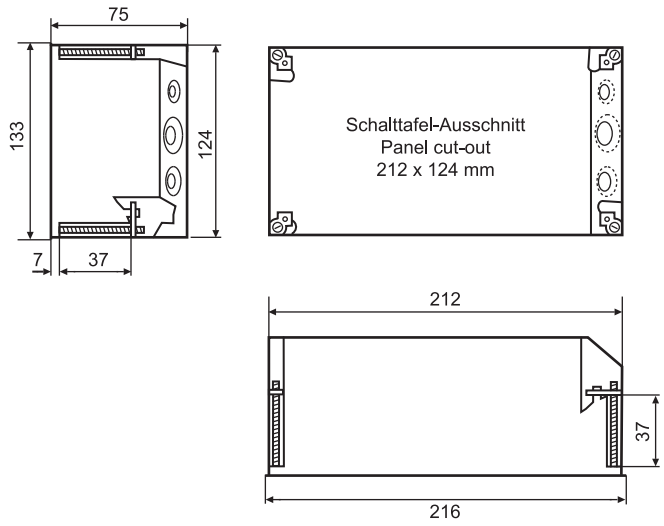
Dimensions are given in mm



2.4.1

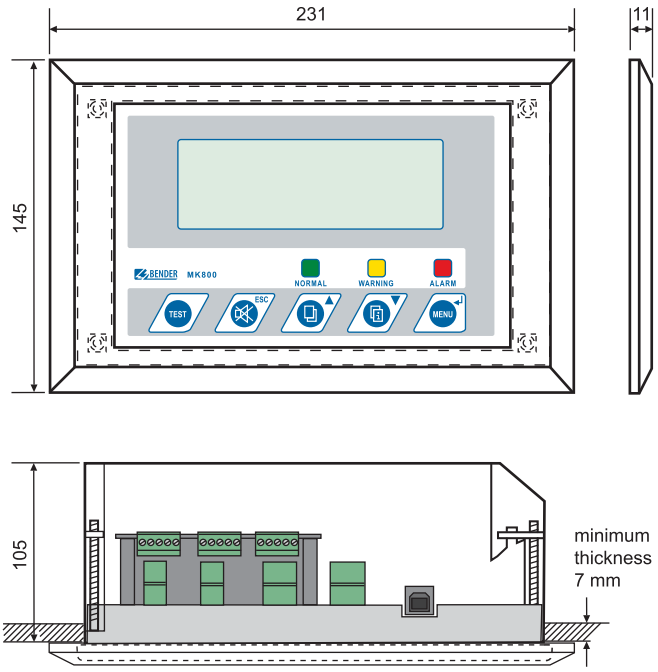
Dimension diagram flush-mounting enclosure UP800

Dimensions are given in mm



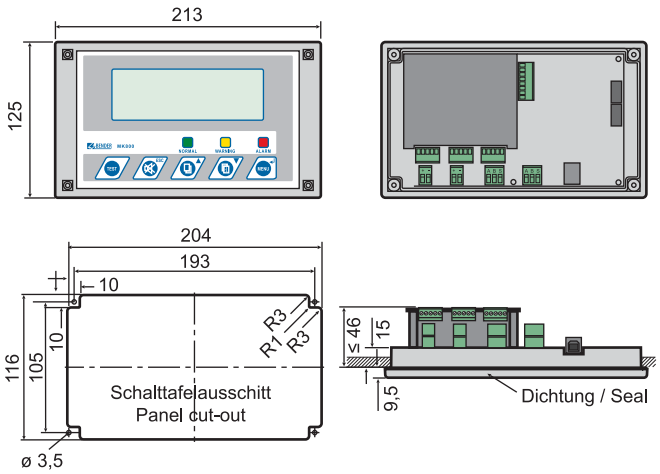
Dimension diagram MK800-11/MK800-12 with bezel frame BR800 and flush-mounting enclosure UP800, example: cavity wall mounting

Dimensions are given in mm



Dimension diagram MK800-11/MK800-12, example: door mounting

Dimensions are given in mm

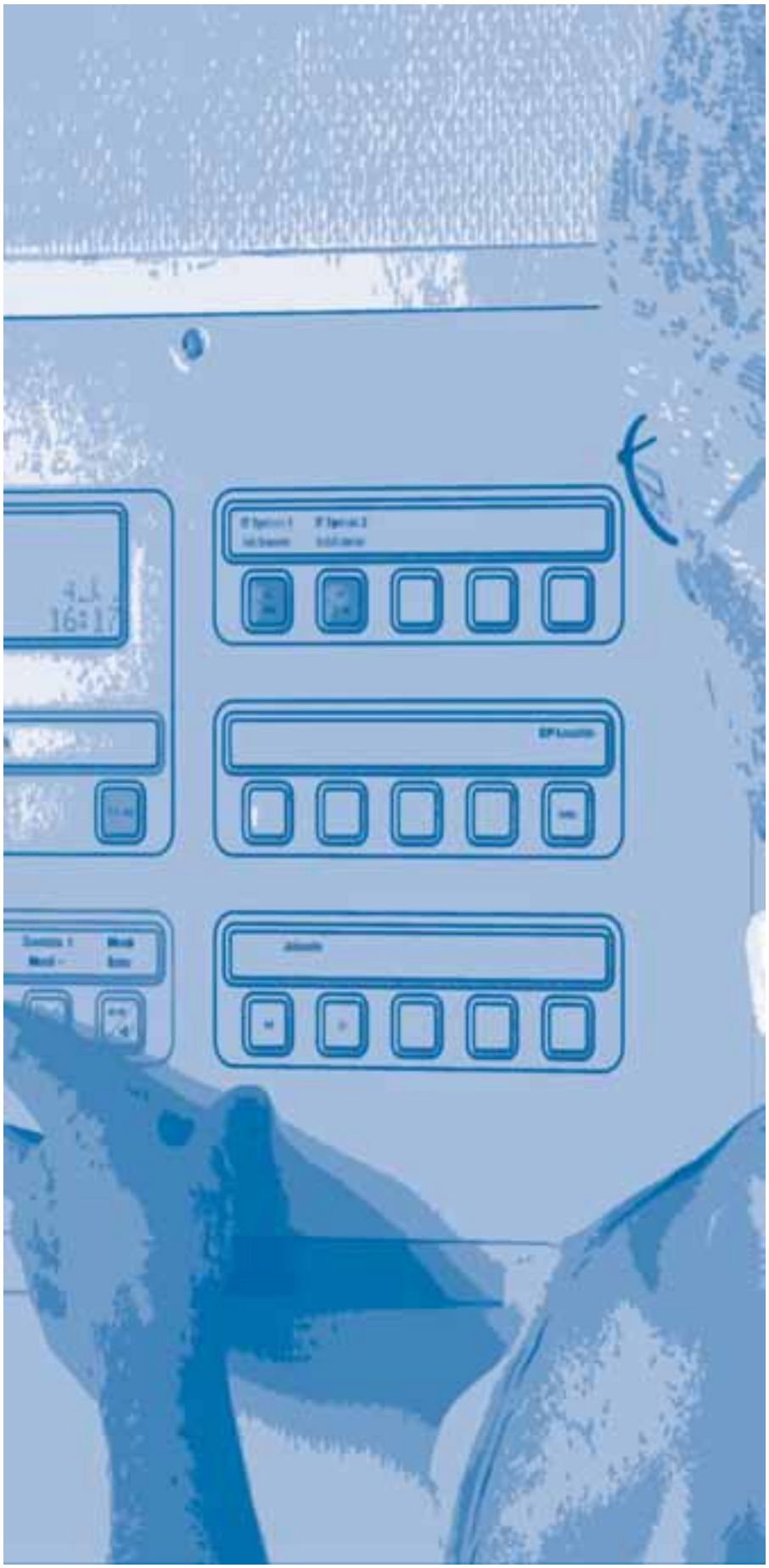


2.4.1

Indication and operation

Alarm indicator and operator panels for medical locations and other facilities

Chapter 2.4



Remote alarm indicator and test combinations for medical locations, nurses rooms, porter's offices, central monitoring rooms, central fire alarm systems and many more.

Alarm indicator and operator panels acc. to IEC 60364-7-710:2002-11 para. 710.413.1.5 and DIN VDE 0100-710:2002-11 para 710.413.1.5 “Medical IT system” and IEC 60364-7-710:2002-11 para. 710.5.3 and DIN VDE 0100-710:2002-11 para. 710.413.5 “Switzgear and controlgear”.

TM800

Device features

- Display, control and operation of Bender monitoring systems and third-party systems
- Backlit clear LC text display (4 x 20 characters, 8 mm)
- Display of additional text supplies medical and technical personnel with specific information
- A set of LEDs, red, yellow and green, allowing messages to be indicated in an order of priority
- 80 predefined standard texts in 20 languages
- 1000 freely programmable message texts
- Easy parameter setting with PC (USB interface) or menu
- Memory with real-time clock to store 1000 alarm messages with date and time stamp
- Variable illuminated pushbutton modules allow freely configurable function assignment
- Closed foil surface allowing, easy integration of third-party systems, such as operating theatre table controls, medical gases, intercom systems, etc.
- Control of third-party systems by flexible I/O modules with galvanic separation
- Alarm LED at each input/output for fast diagnosis
- Functions can easily be expanded by adding I/O modules
- Clearly defined project structure due to an external and internal bus
- Non-reflecting, multicoloured foil.
- Optionally available with an antibacterial foil surface.

Product description

In terms of the human/machine interface, alarm indicator and operator panels play a crucial role. Their task is to take system information and transform it into clear instructions, particularly in the event of critical operating situations. The flexible TM800 panels provide solutions that meet the requirements of modern medical facilities as well as industrial and functional buildings. They are used for

- indication and visualization of operating status and alarm messages;
- central operation and parameter setting of BMS bus devices;
- visual and audible indication of alarm messages;
- displaying measured values and setting of response values for monitoring purposes

from Bender monitoring systems with BMS-bus capability, such as MEDICS, RCMS or EDS. Furthermore, they are used for indication, control and operation of

- operating theatre tables
- medical gas supply equipment
- air conditioning and ventilation systems
- interior lighting
- communication systems

and third-party systems. The integration of third-party systems in one single panel allows the creation of a kind of “technical control centre” in the appropriate room.

LC display with a set of LEDs

Text is displayed on an illuminated LC display in 4 x 20 characters (8 mm high). It supplies medical and technical personnel with information that is always clear and unambiguous, in order to help them to make decisions. Every alarm message comprises three lines which appear spontaneously and three additional lines which can be displayed at the touch of a button. This additional text provides further information, e.g. instructions with the respective telephone number.

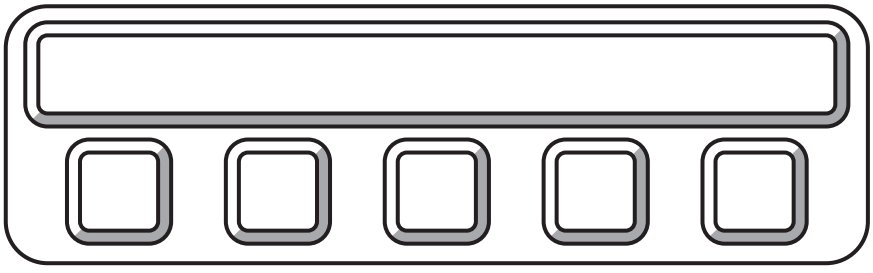
The fourth line contains status information, such as number of messages, test procedures or menu information. Three LEDs in different colours (green, yellow, red) are located below the text display which allow messages to be visually indicated in an order of priority. Five large illuminated buttons are used to operate the system in terms of the following functions:

- Acknowledgement of acoustic alarms
- Functional test of assigned ISOMETER®
- LED test
- Scrolling alarm textes and messages
- Parameter setting

Illuminated pushbutton modules

Each pushbutton module consists of five pushbuttons. Depending on the type of operator panel, a different number of pushbutton modules is available. An individual function can be assigned to each pushbutton (switch, pushbutton, LED audible alarm), by using a PC software. The link between the pushbutton and the appropriate input, output or interface is also carried out via the PC software. In addition, different acoustical messages can be set. This emphasizes the essential benefit of the TM800 panel: Functions can also be modified later without any problems, the hardware need not to be changed.

Example of a pushbutton module



Inputs and outputs

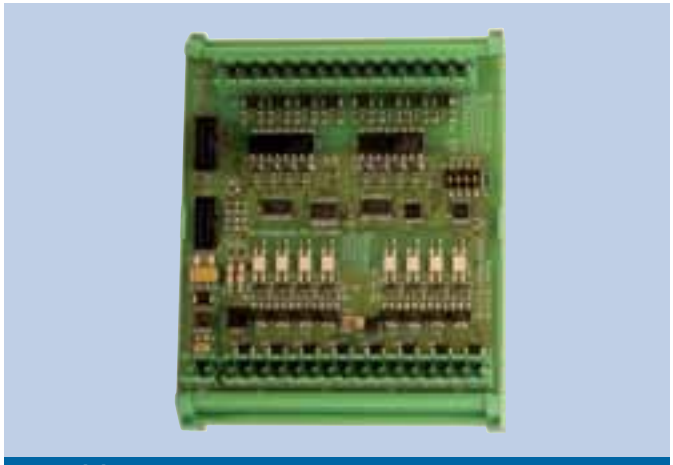
Digital inputs and outputs as well as relay outputs are provided for the control and indication of different technical equipment. The digital inputs are designed for a voltage of AC /DC 0…30 V, but in practical application the messages often arrive as potential-free contacts, this voltage is supplied by the integrated power supply unit. The performance of the alarm contact at the digital input (N/O contact or N/C contact) can be assigned via this PC software. That means that subsequent modifications of the contact performance do not require hardware modifications on the panel. The relay outputs (potential-free contacts) are controlled through operating or alarm messages or via the pushbutton modules. The assignment message resp. pushbutton / relay output is carried out via the TMK-Set PC software. Freely selectable text messages can be assigned to each input / output.

The I/O modules are installed into the flush-mounting box on a DIN rail separately from the display and the pushbutton modules. So the system can easily be expanded. Each input and output provides an alarm LED so that the status is clearly visible at a glance. The following I/O modules are available:

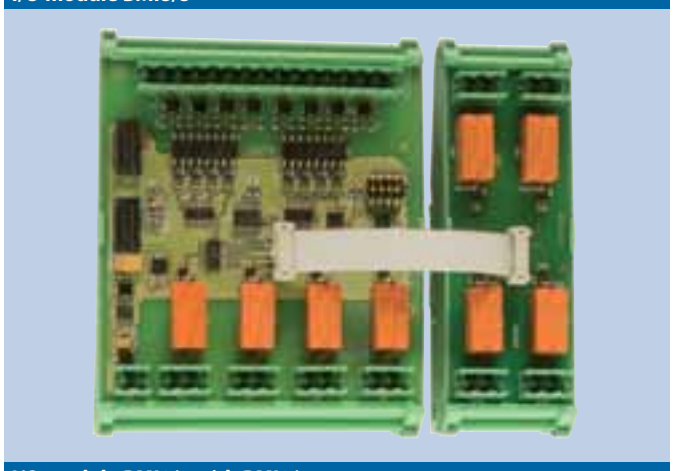
BMI8/8 8 digital inputs, 8 open-collector outputs

BMI8/4 8 digital inputs, 4 relay outputs (one changeover contact each)

BMI0/4 extension for BMI8/4 by further 4 relay outputs (BMI0/4 can only be used in connection with BMI8/4).



I/O module BMI8/8



I/O module BMI8/4 with BMI0/4

History memory

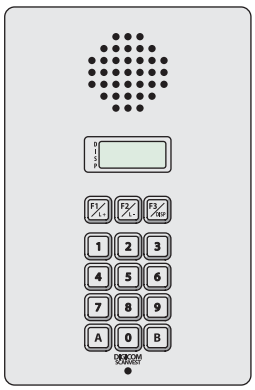
Warning and alarm messages with date and time stamp are automatically stored in the memory. This guarantees reproducibility at all times. A total of up to 1000 messages can be stored. The history can be read out via the TK-History PC software or the function keys at the TM panel.

Individual components to be built in

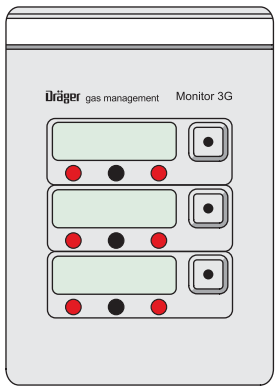
In addition to the operating functions which can be activated via pushbuttons, often complete operating units of third-party systems and systems are integrated into the alarm and operator panel. Typical examples are of operating table controls or intercommunication systems. These modules are integrated into the panel by esb (elektro systembau bender) in order to provide an aesthetically attractive functional solution. The required connections are wired to terminals the designations of which correspond to the indications of the respective manufacturer. In this way, the technician is assisted and connection can be carried out with a minimum of time and effort. Generally, there is no limit on the installation of third-party systems. There are cost-efficient solutions available for special products.

Typical examples of third-party systems used in medical locations

Medical gases	Intercom systems	Operating theatre luminaires	Operating theatre table
Dräger	Digicom-Scanvest Gehrke Schneider Stentofon Telecom Behnke	ALM Berchtold Dräger Haraeus	Maquet Trumpf



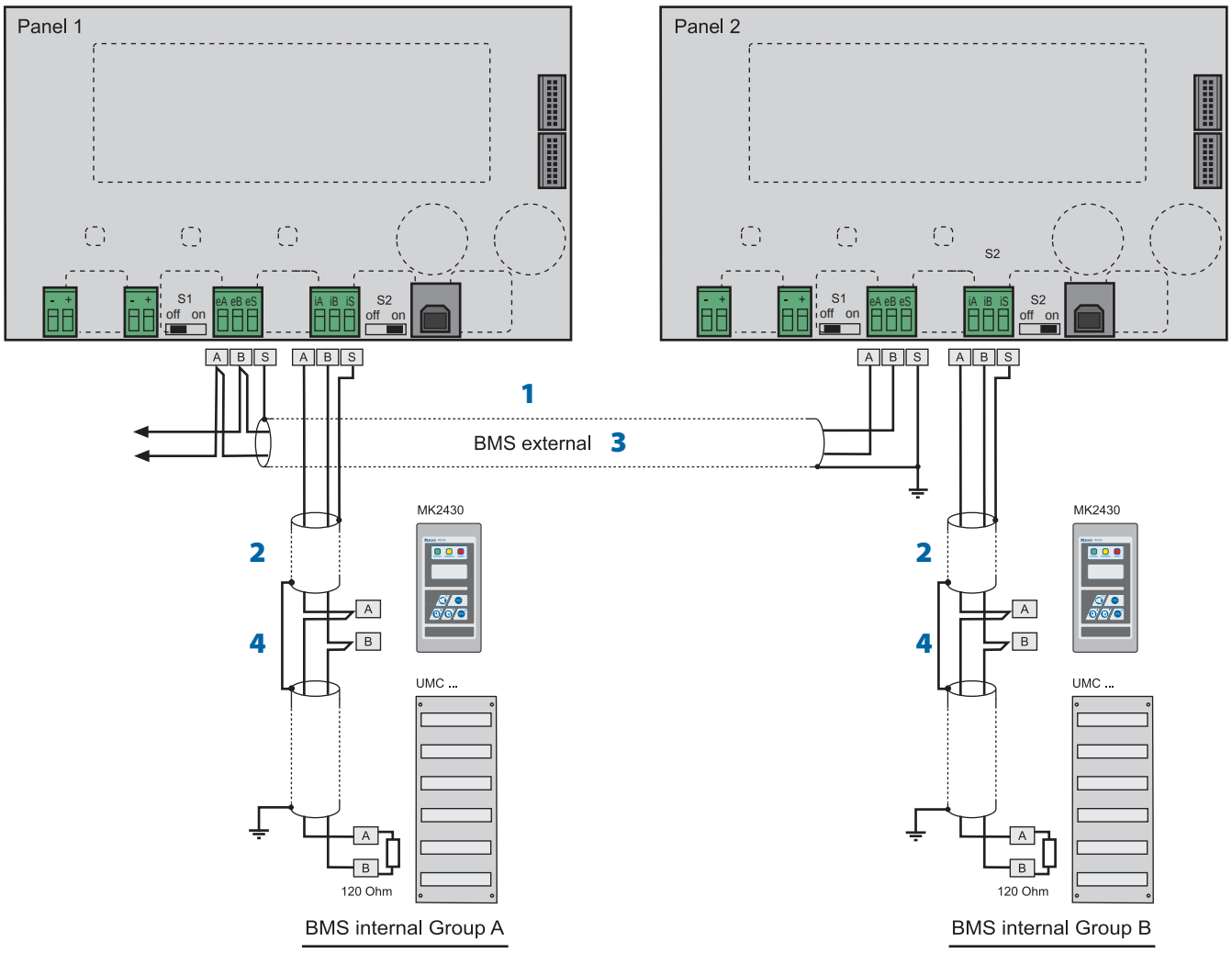
Communication system – Digicom



Dräger Monitor 3G

2.4.2

Example of the categorization into internal and external bus devices



1 - External BMS subsystems: All internal BMS subsystems integrated into a higher-level BMS system, e.g. for the central technical control room.

2 - Internal BMS subsystems: For all BMS components within one section, e.g. operating theatre section, intensive care unit

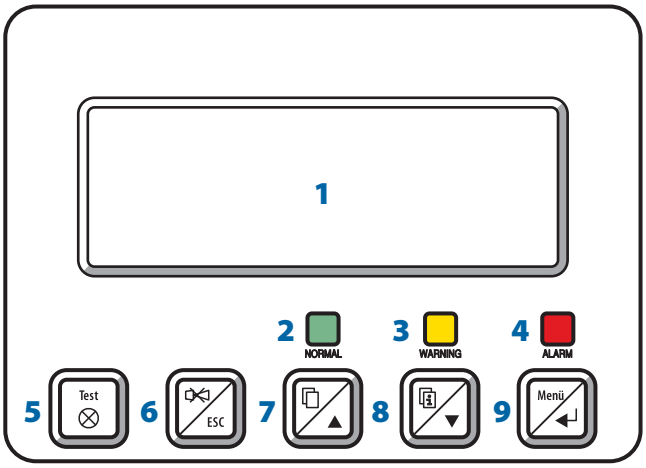
3 - Bus devices 1…30 (99)

4 - Bus devices 1…30 (150)

Communication

The alarm indicator and operator panels of the TM800 series and the changeover and monitoring modules of the MEDICS series (UFC, UMC, LFC …) can be connected via the BMS bus to exchange data with each other. Generally, a distinction is made between the internal and external bus. That allows a clearly defined project structure and certain areas can easily be grouped. A panel and all the monitoring equipment of an operating theatre section are connected to the internal bus, for example. All panels of the TM800 series or alarm and test combinations of the TM800 series are connected to the external bus. Alarm address assignment allows to predefine which messages from which sector are to be displayed on the respective panel. Up to 30 devices can be connected to each internal bus line (in combination with repeaters up to 150 devices). Each bus device receives an address with which it can be identified within the bus line. On each bus line one master is available who controls the information exchange. Generally, this is the panel (TM800 series) or an alarm and test combination.

Operating and display elements – Basic version



1 - LCD: Display of operating status and alarm messages
2 - LED “NORMAL”: Operation indicator - error-free operation
3 - LED “WARNING”: Warning messages
4 - LED “ALARM”: Alarm messages
5 - Test button “TEST”: To activate the test for connected and assigned insulation monitoring devices
6 - “Buzzer mute” button: In operating mode: to mute the buzzer. In menu mode: Buzzer mute and Esc function.
7 - “Scroll” button: In operating mode: to scroll messages. In menu mode: Up key
8 - “Additional text” button: In operating mode: In menu mode: Down key
9 - “Menu” button: In operating mode: to call up the menu mode. In menu mode: Enter function.

Mechanical design

The design of the alarm indicator and operator panels is based on the individual customer requirements in terms of interior design and the architect's and constructor's needs. The following basic versions of alarm indicator and operator panels are available:

- Flush-mounting type enclosure with bezel frame
- Flush-mounting type enclosure with mounting frame
- Surface-mounting type enclosure with a frame of anodized aluminium

But also room-high stainless-steel panels or other versions present no problem. Due to its continuous foil surface, the panel is easy to clean and suits hygiene critical surface applications. For additional protection, the front panel surface can also be delivered with anti-bacterial surface.

The mounting frame is made of anodized aluminium, which can be adjusted accurately to the tile pattern, and in this way permits close wall mounting. Bezel frames are made of anodized aluminiumin order to ensure increased mechanical stability. The support frame inside the flush mounting or surface mounting case is provided with a permanent elastic sealing in order to avoid the ingress of cleaning agents into the panel. Depending on the size, the front plate is connected to the flush mounting or surface mounting enclosure by two or more rugged hinges. That ensures easy installation and easy access to the terminal strips. All necessary pcb boards and indicating elements are permanently fixed to the front plate using threaded bolts or plaster frames. The front plate is connected with the mounting plate via a flexible spiral hose that is fixed on both sides with cable clips. The technical equipment and systems are directly connected to the I/O modules, which are fixed on a mounting plate. The power supply unit for the alarm indicator and operator panel is also located on this mounting plate. The mounting plate can easily be dismantled. In this way, it is possible to install the flush mounting or surface mounting enclosure before the final assembly. Since except for the mounting plate no other components are fixed to the baseplate of the flush-mounting/ surface-mounting enclosure, the technician has sufficient room for installation.

Parameter setting

The intuitive, user-friendly TMK-Set PC software allows individual texts to be programmed and assigned to 1000 individual messages via USB interface or the BMS bus. A warning or alarm LED as well as an acoustic signal can be assigned to each message. 80 pre-defined standard message texts each in 20 languages facilitate parameter setting.

Standards

The TM800 remote alarm indicator and operator panel complies with the requirements of DIN VDE 0100-710, IEC 60364-7-710.

Flush-mounting type and surface-mounting type enclosures for alarm indicator and operator panels

AP version

UPB version

UPE version

AP version

Surface-mounting enclosure (AP) made of anodized aluminium suitable for both pure surface mounting or for partially recessed mounting.
Mounting depth: 90, 150 or 210 mm

UPB version

A gap of up to 12 mm between the flush-mounting enclosure and the wall can be concealed with a bezel frame made of anodized aluminium.

This version, for example, is recommended to be used for wallpapered walls or walls with non-standard tiles.

UPE version

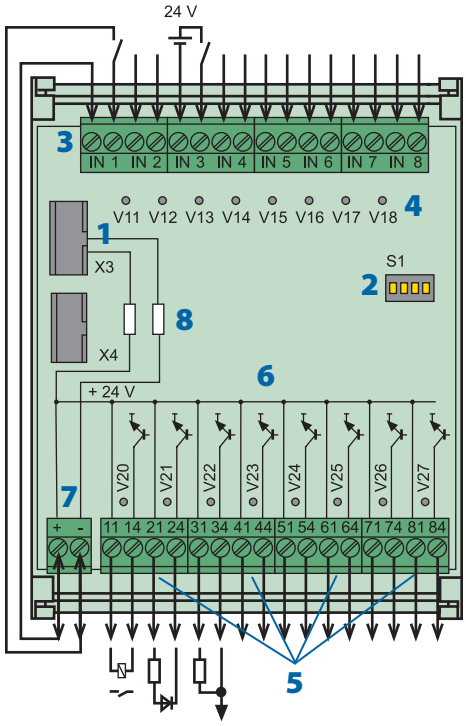
The plaster frame permits accurate and close wall mounting and is made of anodized aluminium. This type of mounting frame is preferably used where the enclosure must precisely fit the tile pattern.

Features:

- Buckling resistant plastic enclosure for flush-mounting or anodized aluminium frame for surface mounting.
- A seal against ingress of liquids into the panel (IP54).
- Easy to install by fixing the front plate to rugged hinges.
- The front plate can be fixed without screws, the foil surface remains closed.
- Customer-specific adaptation of the enclosure dimensions.
- Standard enclosures for different tile patterns.
- Anodized aluminium mounting frame allows close wall mounting.
- Pre-perforated knockouts for cable entry.
- Flame resistant plastic material.

The flush-mounting enclosure of the UPE series (mounting frame) and the UPB series (bezel frame) are made of inherently stable plastic material (flame-resistant, self-extinguishing). The external dimensions of the alarm indicator and operator panel depends on the internal components and the local installation conditions, like the tile pattern, for example. The standard installation depth (top edge front plate / bottom edge flush-mounting enclosure) is 120 mm. Conforming to the standards, the panel is connected with the built-in enclosure via a rugged hinge. That not only allows easy installation, but also is of advantage when the enclosure has to be opened. The hinge is generally located on the right. Lead the cable into the enclosure from above.

Wiring diagram I/O module BMI8/8



1 - X3 — Connector for connecting additional I/O modules and connection to the display module

2 - S1 — DIP switch for address setting.

3 - IN1…8 — Digital inputs 1…8. The digital inputs either have to be activated via potential-free contacts or via voltage signals.

4 - V11…V18 — Alarm LEDs, light up when voltage is connected to the associated digital input.

Input	Alarm LED	Input	Alarm LED
IN1	V11	IN5	V15IN2
V12	IN6	V16IN3	V13
IN7	V17IN4	V14	IN8
V18			

5 - 11…84 — Open-collector output for activating LEDs, relays etc.

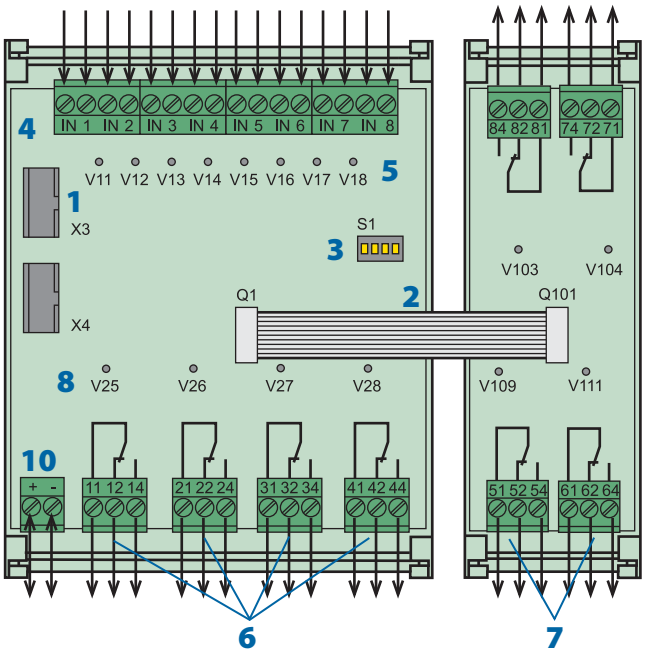
6 - V20…V27 — Alarm LED, lights up when the associated open-collector output is closed.

Output	Alarm LED	Output	Alarm LED
11, 14	V20	51, 54	V24
21, 24	V21	61, 64	V25
31, 34	V22	71, 74	V26
41, 44	V23	81, 84	V27

7 - A1, A2 — Supply voltage U_S DC

8 - S2, S3 — Remove the bridges R42, R59 entfernen, in case of U_S from an external supply.

Wiring diagram I/O modules BMI8/4 with BMI0/4



1 - X3 — Connector for connecting additional I/O modules and connection to the display modules

2 - Q1, Q101 — Connecting cable between BMI8/4 and BMI0/4

3 - S1 — DIP switch for address setting.

4 - IN1…8 — Digital inputs 1…8. The digital inputs either have to be activated via potential-free contacts or via voltage signals.

5 - V11…V18 — Alarm LEDs, light up when voltage is connected to the associated digital input.

Input	Alarm LED	Input	Alarm LED
IN1	V11	IN5	V15IN2
V12	IN6	V16IN3	V13
IN7	V17IN4	V14	IN8V18

6 - 11, 12, 14… 41, 42, 44 — Four relay outputs on the BMI8/4 I/O module for the activation of loads.

7 - 51, 52, 54… 81, 82, 84 — Four relay outputs on the BMI0/4 I/O module for the activation of loads.

8 - V25…V28 — Alarm LEDs on the BMI8/4 I/O module, light up when the associated relay is energized.

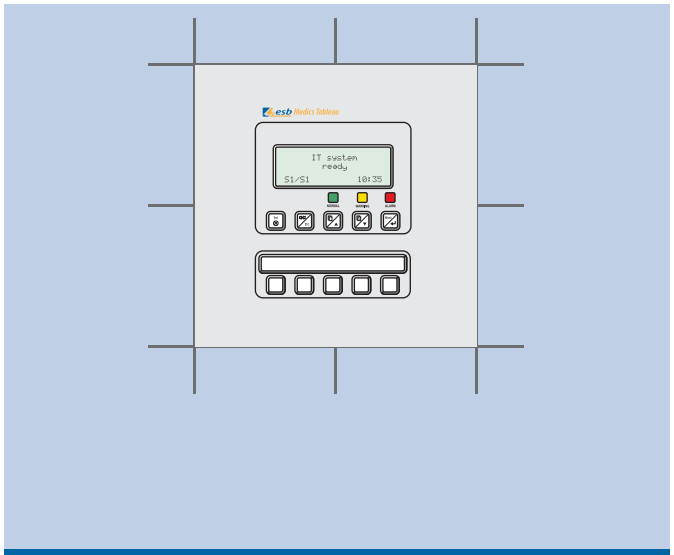
Output	Alarm LED
11, 12, 14	V25
21, 22, 24	V26
31, 32, 34	V27
41, 42, 44	V28

9 - V103, V104 V109, V111 — Alarm LEDs on the BMI8/4 I/O module, light up, when the associated relay is energized.

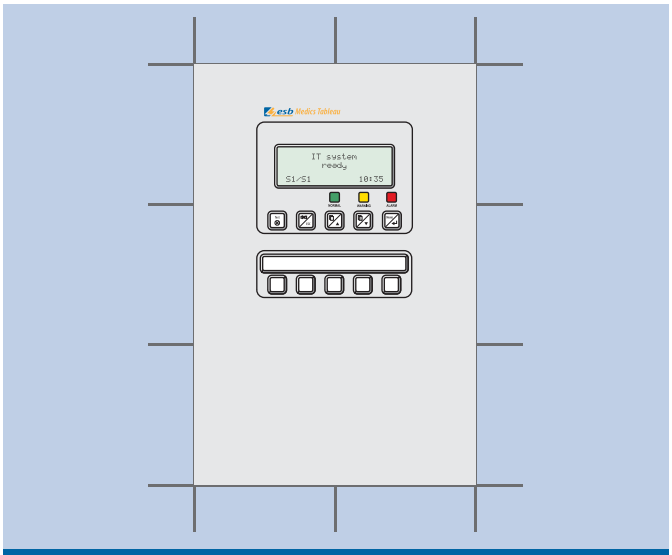
Output	Alarm LED
51, 52, 54	V109
61, 62, 64	V111
71, 72, 74	V104
81, 82, 84	V103

10 - A1, A2 — Supply voltage U_S DC

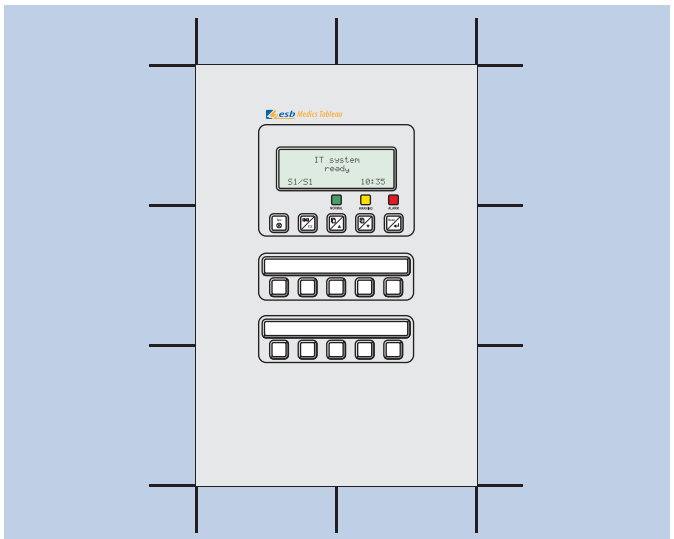
Example of different TM800 alarm indicator and operator panel versions



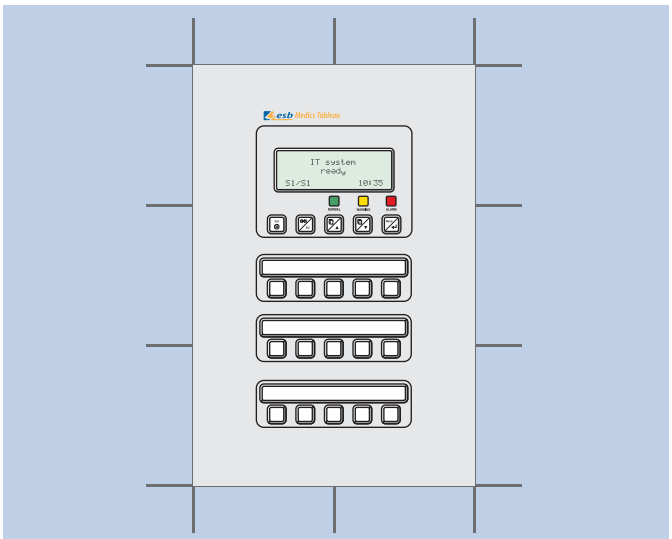
TM 22-0



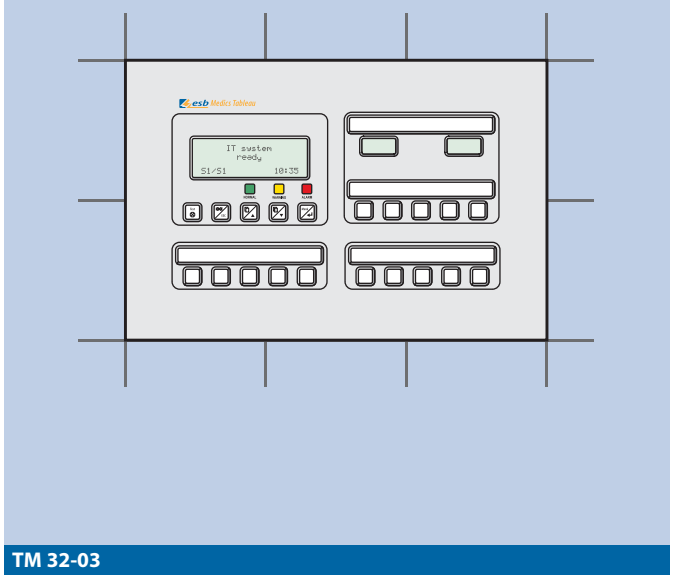
TM 23-0



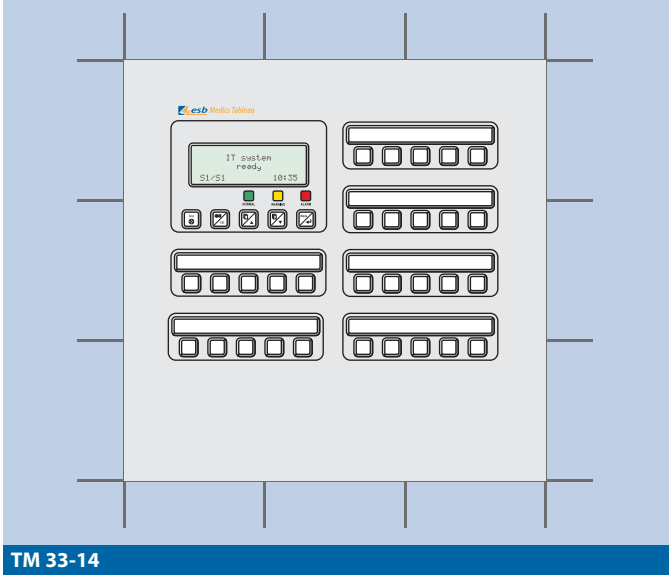
TM 23-1



TM 23-2



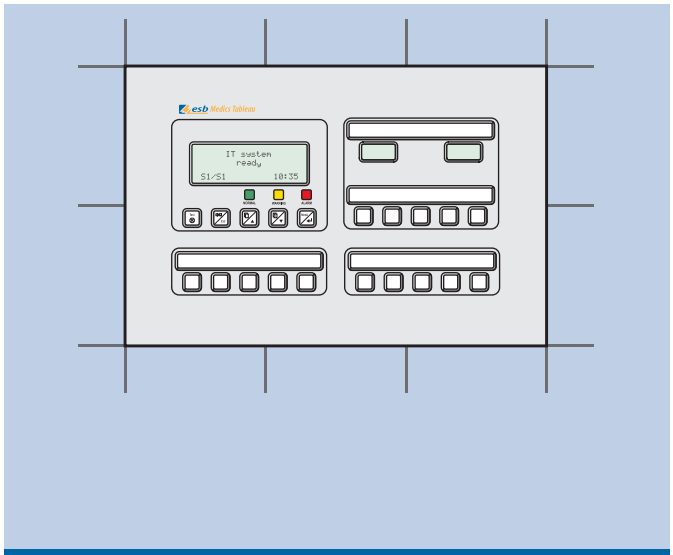
TM 32-03



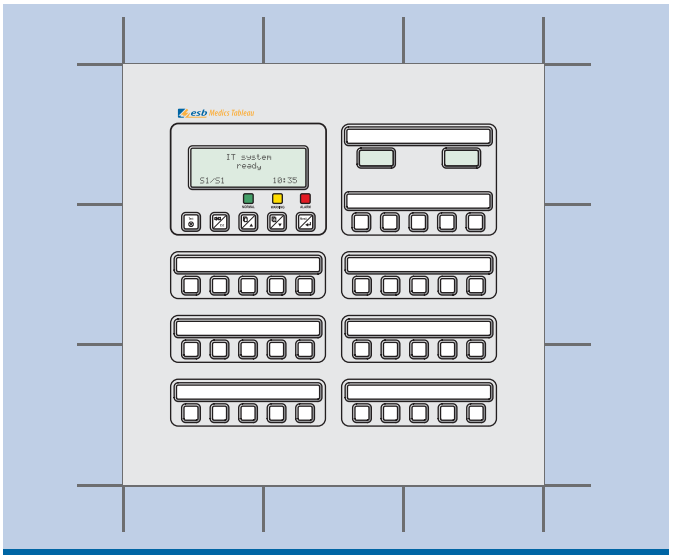
TM 33-14

Grid dimensions approx. 150 x 150 mm

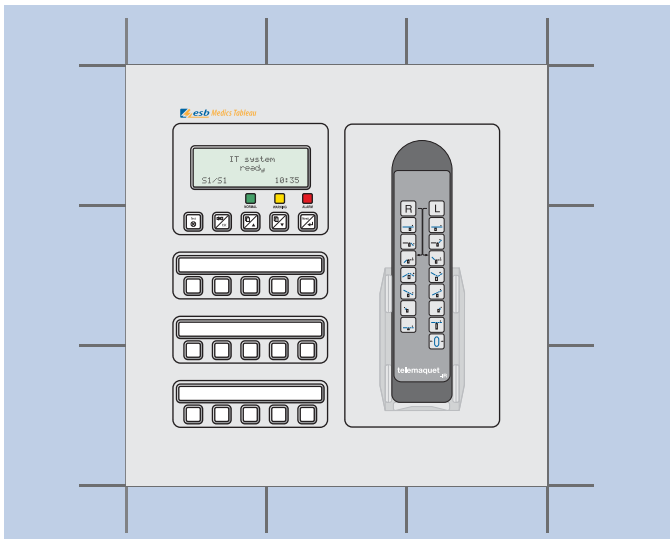
Example of different TM800 alarm indicator and operator panel versions



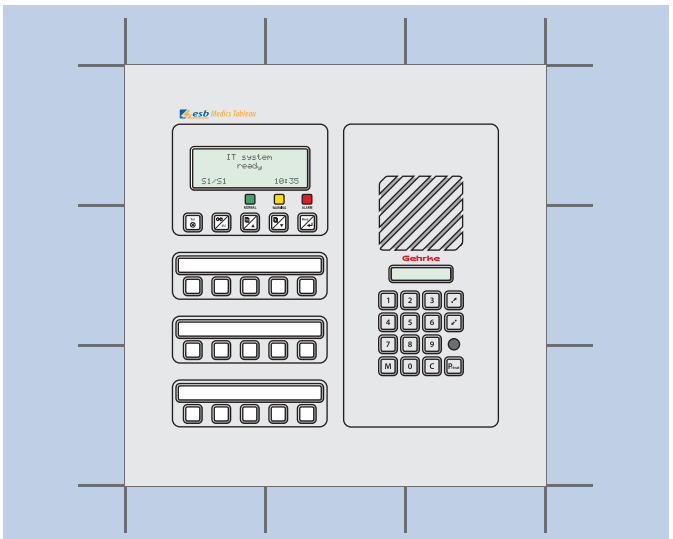
TM 32-02-K1



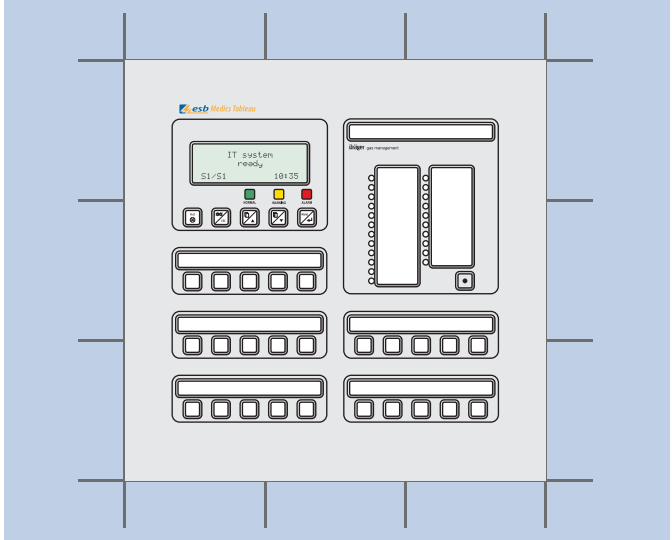
TM 33-24-K2



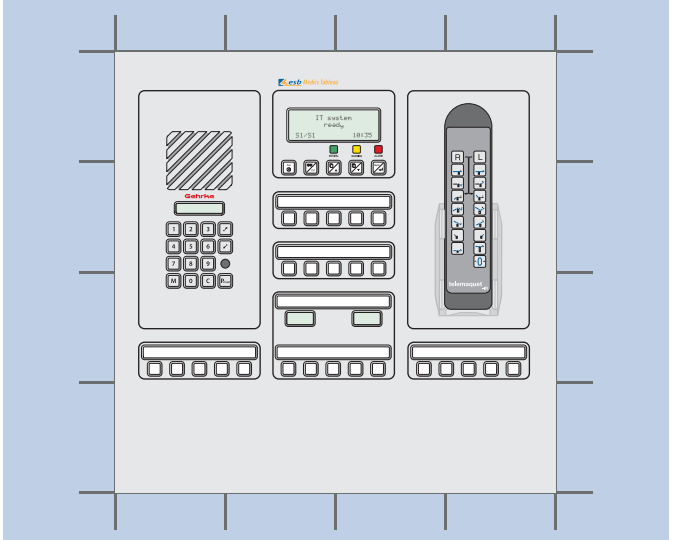
TM 33-20-0M



TM 33-20-S



TM 33-22-ML

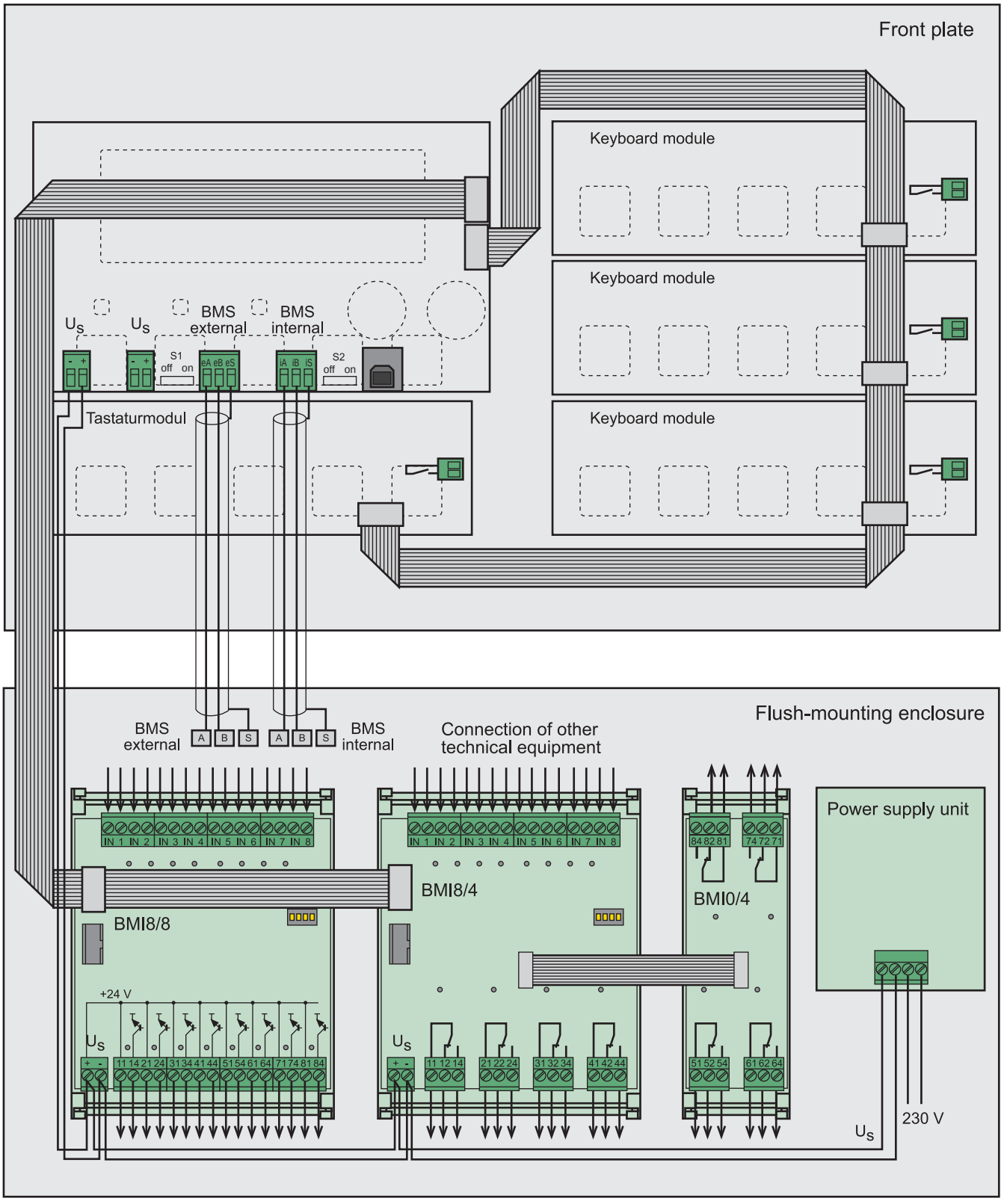


TM 44-121-SK20M

Grid dimensions approx. 150 x 150 mm

2.4.2

Example of panel design



2.4.2

Technical data TM800

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Supply voltage

Supply voltage U_S	AC / DC 24 V
Frequency range U_S	0 / 40…60 Hz
Operating range U_S	AC 18…28 / DC 18…30 V
Supply voltage U_S incl. power supply unit	AC 230 V / 50…60 Hz (- 15…+ 10 %)

Display module BM800

Displays and LEDs	
Display, characters	four lines, 4 x 20 characters
Standard message texts in	20 languages
Alarm addresses	≤ 300
Programmable text messages	≤ 1000
History memory (messages)	≤ 1000
Standard text message	3 x 20 characters
Additional text message (accessed via key)	3 x 20 characters
Alarm LEDs (three different colours)	NORMAL (green) WARNING (yellow) ALARM (red)
Menu texts	German/ English
Keys	5 (Isometer test, buzzer mute, additional text, scroll, menu)
Power consumption	≤ 5 VA

Buzzer

Buzzer message	can be acknowledged, adoption of characteristics of new values
Buzzer interval	configurable
Buzzer frequency	configurable
Buzzer repetition	configurable

Interface internal/external

Interface / protocol	2 x RS-485 / BMS
Int. / ext.	baud rate 9.6 kbit/s / 57.6 kbit/s
Cable length	≤1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W) connectable via DIP switch
Device address, BMS bus int. / ext.	1(…150) / 1…99
Int./ext device address factory setting	1 (master) / 1 (master)

Programming

Interfaces	RS-485 / BMS / USB
Software	TMK-SET V 3.0 or higher
Factory setting	password activated

Pushbutton module BI800

Max. number of pushbuttons	120
Buttons/alarm LEDs per field	5
Power consumption	≤ 2 VA

Inputs/outputs

Maximum number of inputs and outputs	192/192

Supply voltage BMI8/8 I/O modules and 8/4

Supply voltage U_S	DC 24 V
Operating range U_S	DC 18…30 V

Inputs I/O modulesBMI8/8 and BMI8/4

Digital inputs	8 (IN1…IN8)
Galvanic separation	yes
Control of digital inputs	via potential-free contacts/ extraneous voltage
Operating principle N/O or N/C operation	can be selected for each input
Factory setting	N/O operation
Voltage range (high)	AC / DC 10…30 V
Voltage range (low)	AC / DC 0…2 V
Power consumption	≤ 2 VA

Outputs BMI8/8

Number	8
Type	open collector
Voltage/ power max.	DC 24 V / 15 W

Outputs I/O-modules BMI8/4 and BMI0/4

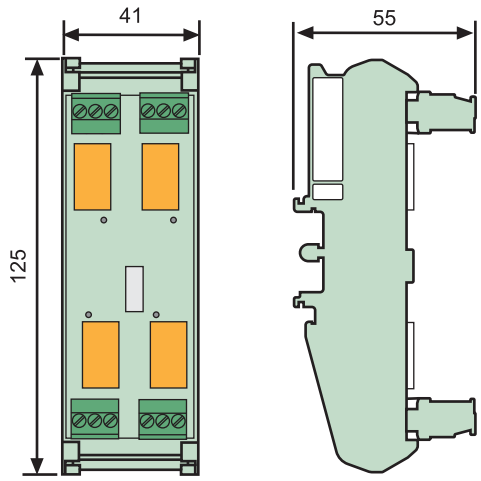
Switching elements					4 changeover contacts (BMI8/4) 4 changeover contacts (BMI0/4)
Operating principle N/C operation / N/O operation					programmable
Electrical service life, number of cycles					10.000
Contact data acc. to IEC 60947-5-1					
Utilization category	AC-13	AC-14	DC-12	DC-12	DC-12
Rated operational voltage	230 V	230 V	24 V	110 V	220 V
Rated operational current	5 A	3 A	1 A	0.2 A	0.1 A
Minimum contact load					1 mA at AC / DC > 10 V

General data

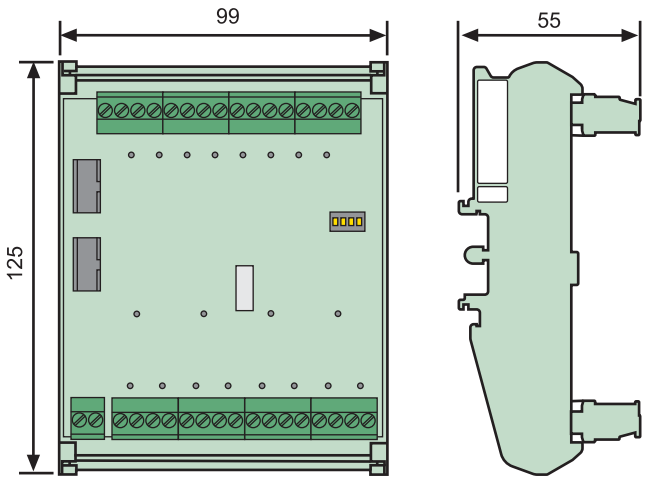
EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Operating temperature	- 5…+55 °C
Classification of climatic conditions IEC 60721	
Stationary use	3K5
Transport	2K3
Storage	1K4
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M2
Storage	1M3
Operating mode	continuous operation
Mounting	any position
Connection type	plug-in terminals
Connection properties (supply voltage, BMS bus)	
rigid / flexible / conductor sizes	0.2…2.5 / 0.2…2.5 mm²/ AWG 24-12
flexible with ferrule without/with plastic sleeve	0.25…2.5 / 0.25…2.5 mm²
Connection properties (inputs)	
rigid / flexible / conductor sizes	0.08…1.5 / 0.08…1.5 mm²/ AWG 28-16
flexible with ferrule without / with plastic sleeve	0.25…1.5 / 0.25…0.5 mm²
Stripping length	7 mm
Tightening torque	0.5…0.6 Nm
Degree of protection, internal components (DIN EN 60529)	IP50
Degree of protection, terminals (IEC 60529)	IP20
Flammability class	UL94V-0
Instruction leaflet / TGH	TGH1409
Weight	according to the respective version

Dimension diagrams (dimensions in mm)

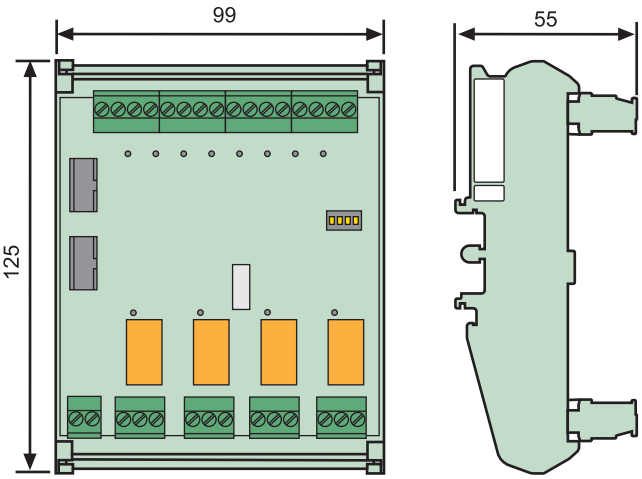
BMI 0/4



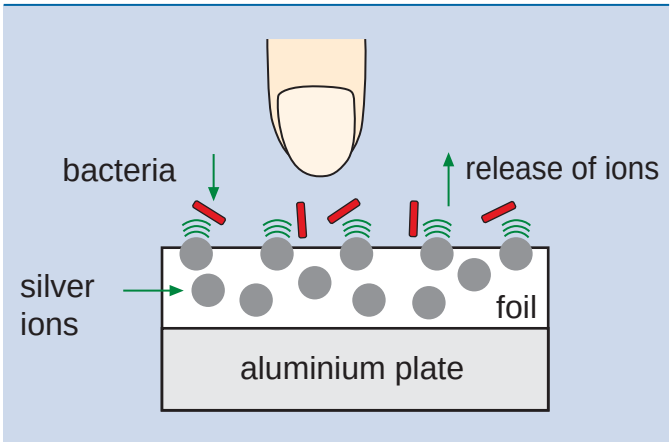
BMI 8/8



BMI 8/4



TM800 antibacterial – the perfect solution for long-term application in all areas where hygiene is of high importance.



Effectiveness of TM antibacterial

TM800

In all areas where people are gathered together, the risk of an infection is extremely high. This, for example, is true for hospitals but also for public buildings, health clinics, doctors' centres, residential homes for the elderly or other communal facilities. Often just turning on the light can be the origin of an infection, because panels can be a reservoir of viruses, bacteria and germs.

esb, as the sole manufacturer so far, provides a solution to this problem: The new panels TM800 antibacterial. For the first time, it is possible to provide an effective barrier to prevent the spread of harmful microbes through contact with the panel. Even more: With the development of a new materials technology, we succeeded in eliminating the breeding ground for pathogens and to prevent any bacteria and fungi settlement and growth.

Silver is a proven germ fighter

The innovative method is based on the antimicrobial properties of silver ions, which are incorporated into the front foil during the manufacturing process. The silver ions are active within the molecular structure of the material. During this process, the inorganic carrier of the stored silver ions bind with ions from the ambient humidity. This reaction activates the antibacterial effect on the panel surface, hence preventing any reproduction and mutation of pathogens.

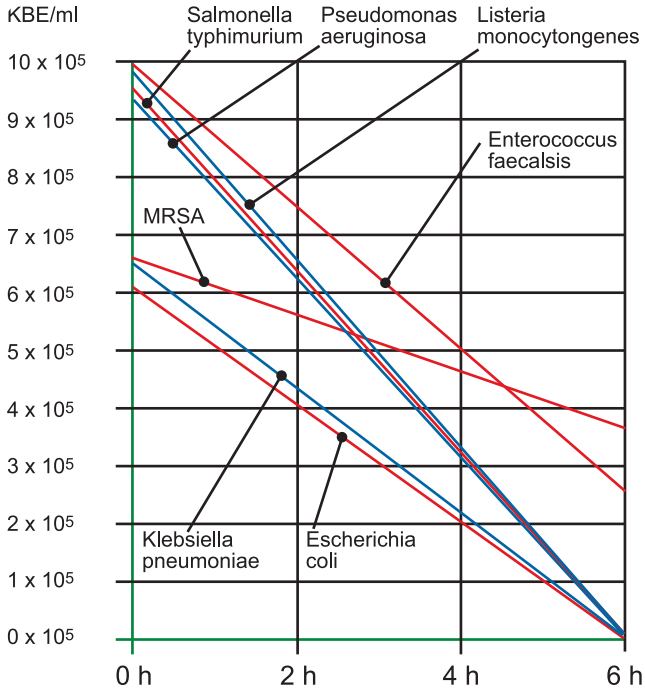
This reduces the risk of the development of new resistant strains of bacteria. In a short time, the micro-organism is completely eliminated without using dubious chemicals which can be harmful to people and the environment. Silver is a natural, harmless element without negative effects. The special exchange mechanism in the material structure, where the atmospheric moisture is used to permanently release silver ions, provides long-lasting effectiveness.

In practice that means: The complete surface of the panel TM800 antibacterial is reliably protected against various types of pathogens for many years. Because not only is the wear life span of the material considerably long but also it is extremely resistant against environmental stress. The antibacterial effectiveness is not impaired, for example, by abrasion, frequent use or temperature changes nor in any other way.

Tested and proofed

In October 2006, the laboratory L+S AG scientifically tested and confirmed the antibacterial effectiveness of TM800 antibacterial. An example of the strains of bacteria tested of the panels resp. foils submitted is shown in the table below.

Test germs		Number of germs used (KBE/ml)	Recovery (log) with TM antibacterial Testing period: 6 h incubation: 20…25 °C
MRSA	Clinical isolat	6.64 x 105	3.70
Escherichia coli	ATCC 11775	6.05 x 105	0
Listeria monicytogenes	ATCC 15313	9.80 x 105	0
Pseudomonas aerugianosa	ATCC 9027	9.44 x 105	0
Salmonella typhimurium	DSM 554	9.54 x 105	0
Enterococcus faecalis	ATCC 29212	9.92 x 105	2.64
Klebsiella pneumoniae	ATCC 13883	6.52 x 105	0



2.4.2

Accessories I/O modules, communication solutions
Signal converters for MEDICS® systems

Chapter 2.5

Input and output modules for connection of third-party systems to MEDICS® systems.

Signal converter SMI472-12

Signal converter SMI472-12

Device features

- 12 digital inputs
- Indicator LED for each channel
- LEDs: Power On, ALARM, activities on the RS-485 interface
- RS-485 interface (BMS bus)
- Operating principle selectable: N/O or N/C operation.

Product description

The signal converter SMI472-12 converts digital signals (operating and alarm messages) to serial output signals for the BMS bus. Its 12 digital inputs can be split into two groups as alarm or operating messages. Factory setting: 8 inputs for alarm messages and 4 inputs for operating messages.

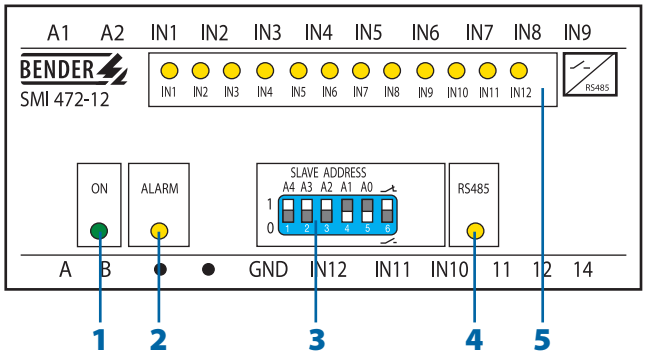
Function

One LED indicator is assigned to each of the inputs IN1 to IN12. The operating principle of the inputs can be set to N/O or N/C operation via a DIP switch. One common alarm relay in N/O operation is available for the transfer of alarm messages.

The SMI472-12 converts the input signals to serial output signals for the BMS bus. Via this interface messages can be transferred to other Bender devices (e.g. to alarm indicator and test combinations of the MK2430 / MK800 series or to TM operator panels.

Note: A BMS bus master is required to operate the SMI472-12.

Operating elements


A1 A2 IN1 IN2 IN3 IN4 IN5 IN6 IN7 IN8 IN9
BENDER
SMI 472-12
IN1 IN2 IN3 IN4 IN5 IN6 IN7 IN8 IN9 IN10 IN11 IN12
RS485
ON
ALARM
SLAVE ADDRESS
A4 A3 A2 A1 A0
RS485
A B GND IN12 IN11 IN10 11 12 14
1 2 3 4 5

1 - LED “ON”: operation indicator

2 - LED “ALARM”: lights whilst an alarm is present at one of the alarm inputs and flashes in case of an impermissible address.

3 - DIP switches to set the device address and the operating mode of the digital inputs

4 - LED “RS-485”: lights in case of activities on the BMS bus

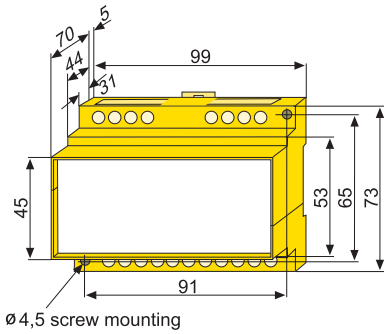
5 - LED “IN1…IN12”: LED lights whilst an alarm or operating-message is present on the respective input.

Ordering information

Type	Supply voltage U_S	Art. No.
SMI472-12	DC 77…286 V/AC 85…265 V 50…60 Hz	B 9204 7011
SMI472-1221	DC 10.5…80 V	B 9204 7013

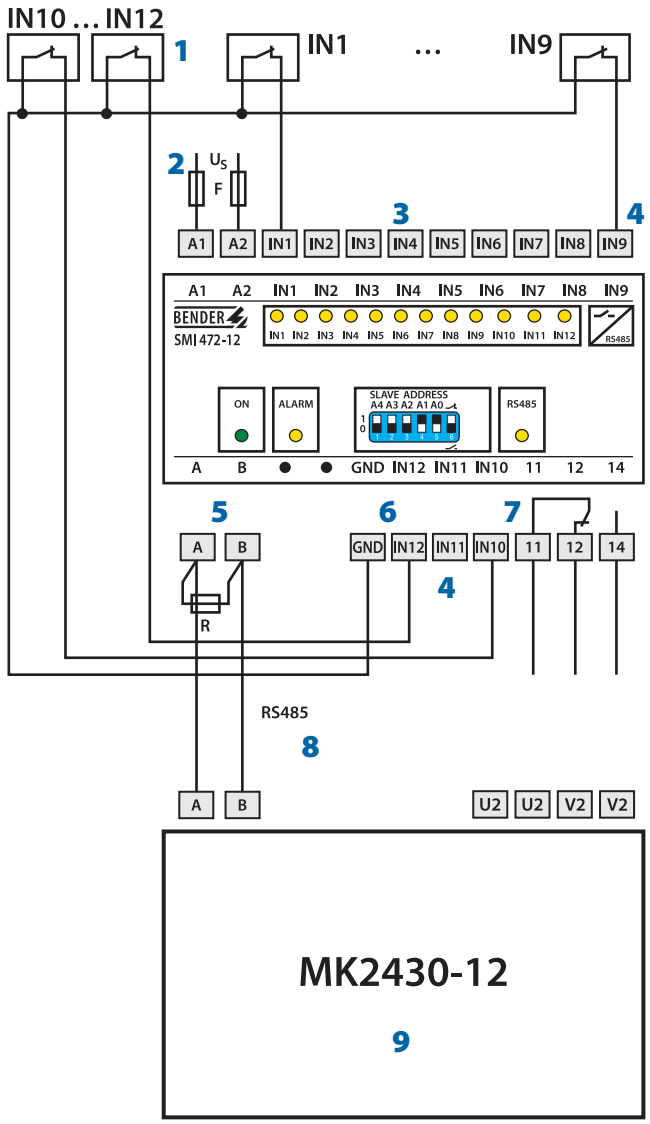
Dimension diagram X470

Dimensions are given in mm



2.5.1

Wiring diagram



1 - Potential-free relay contacts

2 - Connection of the supply voltage U_S, short-circuit protection for supply voltage U_S, 6 A recommended

3 - IN1…IN8 digital inputs for alarm messages

4 - IN9…IN12 digital inputs for operating messages

5 - Connection BMS bus

6 - Common connection of the digital inputs to earth

7 - Alarm relay with the contacts 11, 12 and 14 (common alarm for alarm messages on IN1…IN8)

8 - Terminating resistor BMS bus

9 - MK2430-12 alarm and test combination, alarm texts can be set as required

Technical data signal converter SMI472-12

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Supply voltage

Supply voltage U_S	see ordering information
Frequency range U_S	50…60 Hz
Operating range U_S	0.8…1.15 x U_S
Power consumption	≤ 12 VA

Inputs

Digital inputs	12 (IN1…IN12) (parameter setting: alarm/operating messages)
Operating principle selectable via DIP switch	N/C operation / N/O operation selectable
Factory setting	N/O operation
Galvanic separation	no
Activation of digital inputs	via potential-free contacts

Displays

LEDs	15 (ON, Alarm, RS-485, IN1…IN12)

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor (connectable via DIP switch)	120 Ω (0.25 W)
Device address, BMS bus	DIP switch 2…30
Factory setting, device address	3

Switching elements

Number of changeover contacts	1 changeover contact
Operating principle parameter setting via BMS bus	N/O operation

Contact data acc. to IEC 60947-5-1

Rated operational voltage U_e	AC 230 V / DC 220 V
Rated operational current I_e	AC 5 A / DC 0.2 A
Utilization category	AC 14/DC 12
Electrical service life, number of cycles	10.000
Minimum contact load	1 mA at AC / DC > 10 V

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use /transport/storage	3K5/2K3/1K4
Operating temperature	- 10 °C…+ 55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use/transport/storage	3M4/2M2/1M3
Operating mode	continuous operation
Mounting	any position
Connection	screw-type terminals
Connection properties	
rigid/flexible/conductor sizes	0.2…4/0.2…2.5 mm²/AWG 22-12
flexible with ferrule, without/with plastic sleeve	0.25…2 mm²
Stripping length	8 mm
Tightening torque	0.5 Nm
Degree of protection, internal components /terminal (DIN EN 60529)	IP 30 / IP 20
Type of enclosure/dimension diagram	X470
Screw mounting	2 x M4
DIN rail mounting acc. to	IEC 60715
Flammability class	UL94V-0
Operating manual	BP204010
Weight	≤ 320 g

2.5.1

Signal converter SMO480(E)-12

Signal converter SMO480(E)-12

Device features

- Relay output for each channel of the associated Bender device with communication capabilities, e.g. EDS470-12 or RCMS470-12
- Alarm LED for each channel
- Test button to check the relay function
- LEDs: Power On, ALARM, TEST/FAULT
- RS-485 interface (BMS bus)

Product description

The signal converter SMO480(E)-12 converts serial signals from Bender evaluators (z. B. EDS470(E)-12, RCMS470(E)-12, MK2430-11, SMI470-9) to relay contact messages. One relay is available for each measuring channel of an evaluator. The relay contacts are also suitable for very low currents (> 5 mA). Each SMO480-12 must be assigned to one device with communication capabilities.

Application

- To convert BMS signals from EDS, RCMS and MEDICS systems in relay messages, e.g. to control signals and information
- Specific control and/or selective disconnection of faulty circuits with EDS and RCMS systems
- Data transmission to central process control and building control systems

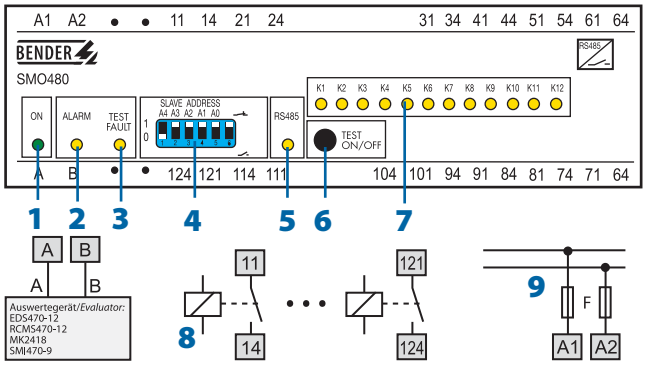
Function

When the connected evaluator outputs an alarm, it will be transmitted via the BMS bus. Then the signal converter SMO480(E)-12 activates the alarm relay of the respective channel.

The operating mode of the alarm relays can be changed from N/O to N/C operation via the DIP switch. The assignment of evaluator to signal converter is made via the device address setting. The address of the associated evaluator is set at the SMO480(E)-12. The device address of SMO480-12 is the value set at the DIP switch +30 (SMO480E-12: +120).

Note: A BMS bus master is required to operate the SMO480(E)-12.

Operating elements



1 - LED “ON”: operation indicator

2 - LED “ALARM”: whilst an alarm is present at one of the alarm inputs and during the test mode.

3 - LED “TEST/FAULT”: lights when no assigned evaluator has been found and during the test mode. The LED flashes in case of an impermissible address.

4 - DIP switch to set the device address of SMO480(E)-12 and to select the operating mode of the alarm relays. Address SMO480-12 = set value +30, address SMO480E-12 = set value +120

5 - LED “RS-485”: lights in case of activities on the BMS bus

6 - “TEST ON/OFF” button: Pressing the button once: will change over the operating mode of all alarm relays, the LEDs ALARM, TEST/FAULT and K1…K12 light. Pressing the button once more: will change over from the test mode to normal operating condition.

7 - LED “K1…K12”: LED lights whilst an alarm message is present at the respective input.

8 - Alarm relay

9 - U_S see ordering information

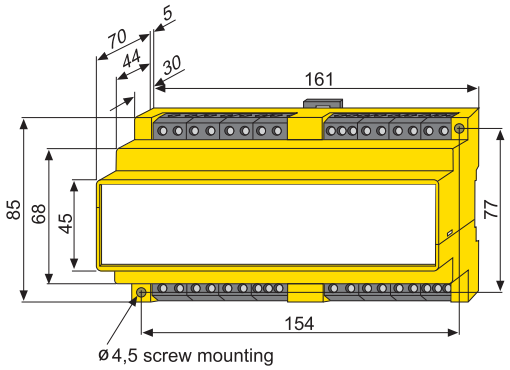
Ordering information

Type	Supply voltage U_S	Art. No.
SMO480-12	AC 230 V	B 9501 2011
SMO480-1213	AC 90…132 V*	B 9501 2017
SMO480E-12	AC 230 V	B 9501 2043

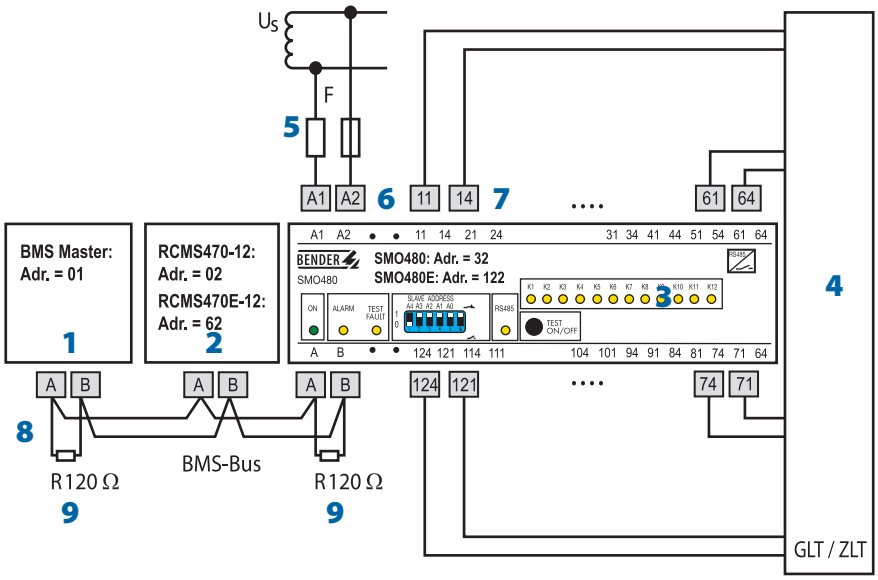
*Absolute value

Dimension diagram X480

Dimensions are given in mm



Wiring diagram – signal converter SMO480(E)-12 (example with RCMS470(E)-12)



1 - BMS master (e,g. FTC470…, PRC1470, MK24…, TM panel)
2 - Residual current evaluator RCMS470(E)-12
3 - Signal converter SMO480(E)-12
4 - GLT = Building Control System ZLT = Central Control System
5 - F = Short-circuit protection supply voltage; 6 A fuse recommended. Supply voltage in IT systems requires two fuses.
6 - Power supply (see ordering information)
7 - 11/14…121/124:contacts of the 12 alarm relays
8 - Connection BMS bus
9 - Terminating resistor BMS bus

Technical data signal converter SMO480(E)-12

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Supply voltage

Supply voltage U_S	see ordering information
Frequency range U_S	50…60 Hz
Operating range U_S	0.8…1.15 x U_S
Power consumption	≤ 8 VA

Displays

LEDs	16 (ON, Alarm, TEST/FAULT, RS-485, K1…K12)

Operating elements

Button	TEST ON/OFF

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor (connectable via DIP switch)	120 Ω (0.25 W)
Device address, BMS bus	30 + (1…30); SMO480E-12: 120 + (1…30)
Factory setting device address	30 + 1; SMO480E-12: 120 + 1

Switching elements

Number	12 x 1 N/O contacts
Operating principle	N/C operation / N/O operation selectable
Factory setting	N/O operation

Contact data acc. to IEC 60947-5-1

Rated operational voltage U_e	AC 230 V / DC 220 V
Rated operational current I_e	AC 5 A / DC 0.2 A
Utilization category	AC 14/DC 12
Electrical service life, number of cycles	10.000
Minimum contact load	1 mA at AC / DC > 10 V

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Long-time storage	1K4
Operating temperature	- 25 °C…+ 55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M2
Long-time storage	1M3
Operating mode	continuous operation
Mounting	any position
Connection	screw-type terminals
Connection properties	
rigid/flexible/conductor sizes	0.2…4/0.2…2.5 mm²/AWG 22-12
flexible with ferrule, without/with plastic sleeve	0.25…2 mm²
Stripping length	8 mm
Tightening torque	0.5 Nm
Degree of protection, internal components (IEC 60529)	IP 30
Degree of protection, terminals (IEC 60529)	IP 20
Type of enclosure/dimension diagram	X470
Screw mounting	2 x M4
DIN rail mounting acc. to	IEC 60715
Flammability class	UL94V-0
Product standards	DIN EN 50178 bis AC 230 V
Operating manual	BP108005
Weight	≤ 580 g

2.5.1

Signal converter SMO481-12

Signal converter SMO481-12

Product description

The signal converter SMO481-12 converts BMS bus switching commands to relay contact messages. The relay contacts are also suitable for very low currents (> 5 mA).

Application

- To convert BMS switching commands from TM operator panels to relay messages, e.g. for lighting system or device control

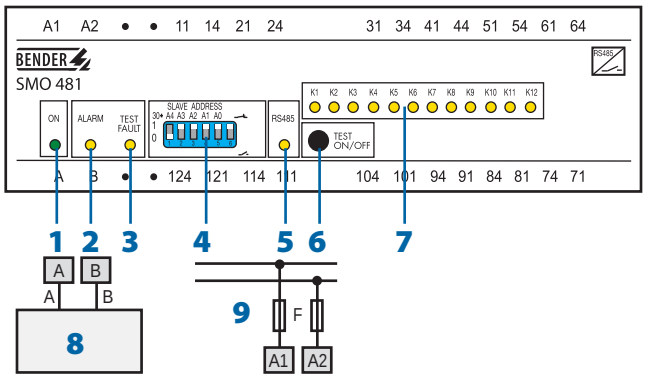
Function

When the signal converter SMO481-12 receives a switching command via the BMS bus, this command will be converted to a relay message.

Device features

- 12 relay outputs
- Operating mode selectable: N/O or N/C operation.
- LED for each channel
- Test button to check the relay function
- LEDs: Power On, ALARM, TEST/FAULT

Operating elements



1 - LED “ON”: operation indicator

2 - LED “ALARM”: lights whilst one (or several) relays respond and during the test mode.

3 - LED “TEST/FAULT”: LED lights during the test mode and flashes when an impermissible address has been selected.

4 - DIP switch, to set the device address of SMO482-12 (address = parameter value + 30) and the operating mode of the alarm relay.

5 - LED “RS-485”: lights in case of activities on the BMS bus

6 - “TEST ON/OFF” button: pressing the test button once: will change over the operating mode of all alarm relays, pressing the test button once again: will change over from the test mode to the normal operating condition.

7 - LED “K1…K12”: LED lights whilst respective relay responds

8 - Connection to TM operator panel

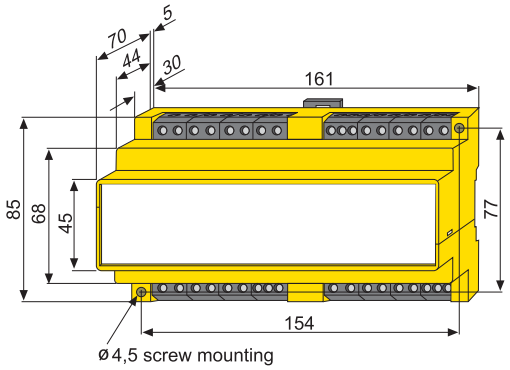
9 - U_S see ordering information, short-circuit protection for supply voltage U_S, 6 A fuse recommended, Note: Supply voltage U_S in the IT system requires two fuses

Ordering information

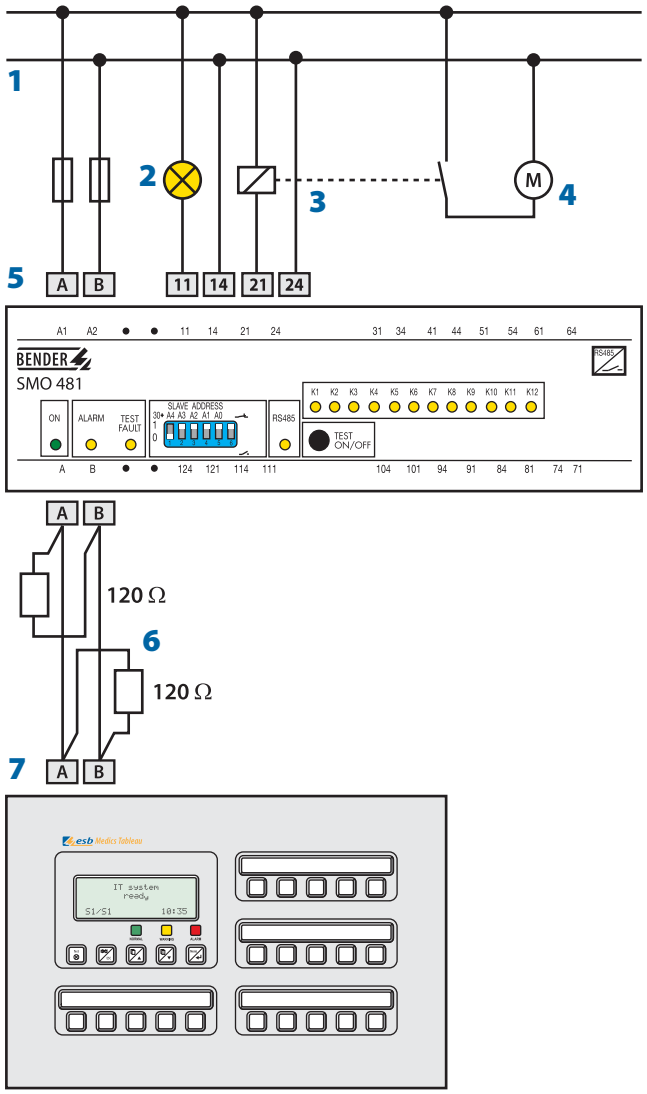
Type	Supply voltage U_S	Art. No.
SMO481-12	AC 230 V	B 9204 7005

Dimension diagram X480

Dimensions are given in mm



Wiring diagram



1 - U_S see ordering information
2 - Load (direct control)
3 - Relay to control load 4
4 - Load
5 - Signal converter SMO481-12
6 - Terminating resistors BMS bus
7 - TM operator panel

Technical data signal converter SMO481-12

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Supply voltage

Supply voltage U_S	AC 230 V
Frequency range U_S	50…60 Hz
Operating range U_S	0.8…1.15 x U_S
Power consumption	≤ 8 VA

Displays

LEDs	16 (ON, Alarm, TEST/FAULT, RS-485, K1…K12)

Operating elements

Button	TEST ON/OFF

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor (connectable via DIP switch)	120 Ω (0.25 W)
Device address, BMS bus	30 + (1…30)
Factory setting device address	30 + 1;

Switching elements

Number	12 x 1 N/O contacts
Operating principle	N/C operation / N/O operation selectable
Factory setting	N/O operation

Contact data acc. to IEC 60947-5-1

Rated operational voltage U_e	AC 230 V / DC 220 V
Rated operational current I_e	AC 5 A / DC 0.2 A
Utilization category	AC 14/DC 12
Electrical service life, number of cycles	10.000
Minimum contact load	1 mA at AC / DC > 10 V

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use /transport/storage	3K5/2K3/1K4
Operating temperature	- 25 °C…+ 55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use/transport/storage	3M4/2M2/1M3
Operating mode	continuous operation
Mounting	any position
Connection	13 x 1 N/O contacts
Connection properties	
rigid/flexible/conductor sizes	0.2…4/0.2…2.5 mm²/AWG 22-12
flexible with ferrule, without/with plastic sleeve	0.25…2 mm²
Stripping length	8 mm
Tightening torque	0.5 Nm
Degree of protection, internal components (IEC 60529)	IP 30
Degree of protection, terminals (IEC 60529)	IP 20
Type of enclosure/dimension diagram	X470
Screw mounting	2 x M4
DIN rail mounting acc. to	IEC 60715
Flammability class	UL94V-0
Product standards	EN 50178 for AC 230 V
Operating manual	BP108011
Weight	≤ 580 g

2.5.1

Signal converter SMO482P-12

Signal converter SMO482-12

Device features

- 12 relay outputs for different channels of Bender devices with communication capabilities
- Operating principle selectable: N/O or N/C operation
- LED for each channel
- Test button to check the relay function
- LEDs: Power On, ALARM, TEST/FAULT
- RS-485 interface (BMS bus)

Product description

The signal converter SMO482P-12 converts BMS bus alarm messages to relay contact messages. The relay contacts are also suitable for very low currents (> 5 mA). Each relay output of the SMO482P-12 can be assigned to any channel of any device with communication capability.

Application

- For the conversion of BMS signals from EDS, RCMS and MEDICS systems in relay messages, e.g. to control signals and information
- Specific control and/or selective disconnection of faulty circuits with EDS and RCMS systems
- Information transfer to central process control and building control systems

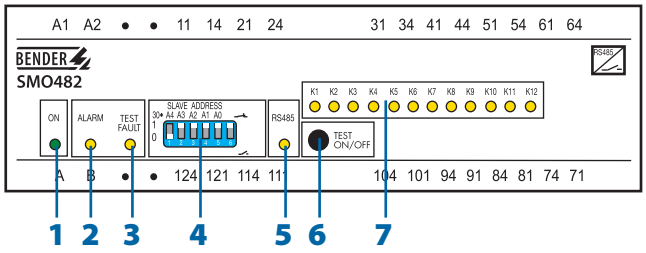
Function

The channels of the SMO482P-12 are assigned to the respective channels of monitoring and control devices of two changeover modules. When an evaluator sends a message in case of a fault in a channel, this message is transferred to the SMO482P-12 via the BMS bus. The SMO482P-12 converts this message to the assigned relay message. Several SMO482P-12 must not be assigned to one channel of the evaluator.

The assignment parameters can be set via the **parameterization** of SMO482P-12.

Note: A BMS bus master is required to operate the SMO482P-12 .

Operating elements



1 - LED “ON”: operation indicator

2 - LED “ALARM”: LED lights whilst an alarm (not an operating message) is present at one of the channels and during the test mode.

3 - LED “TEST/FAULT”: lights when no device parameter have been set and during the test mode. The LED flashes in case of an impermissible address.

4 - DIP switch, to set the device address of SMO482-12 (address = parameter value + 30) and the operating mode of the alarm relay.

5 - LED “RS-485”: lights in case of activities on the BMS bus

6 - “TEST ON/OFF” button: Pressing the button once: will change over the operating mode of all alarm relays, the LEDs ALARM, TEST/FAULT and K1…K12 light. Pressing the button again: will change over from the test mode to normal operating condition.

7 - LED “K1…K12”: LED lights whilst a pending alarm or operating message is present for the respective alarm relay.

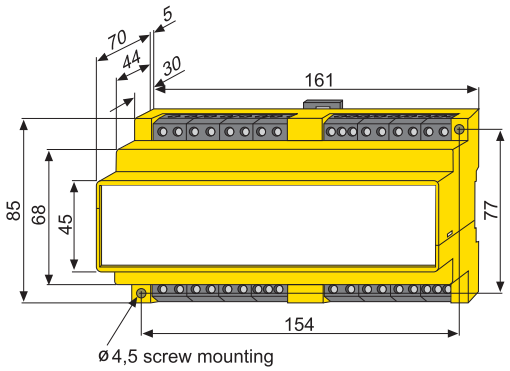
Ordering information

Type	Supply voltage U_S	Art. No.
SMO482P-12*	AC 230 V	B 9501 2039 P

* Channels can be factory-programmed as per customer request (Option P)

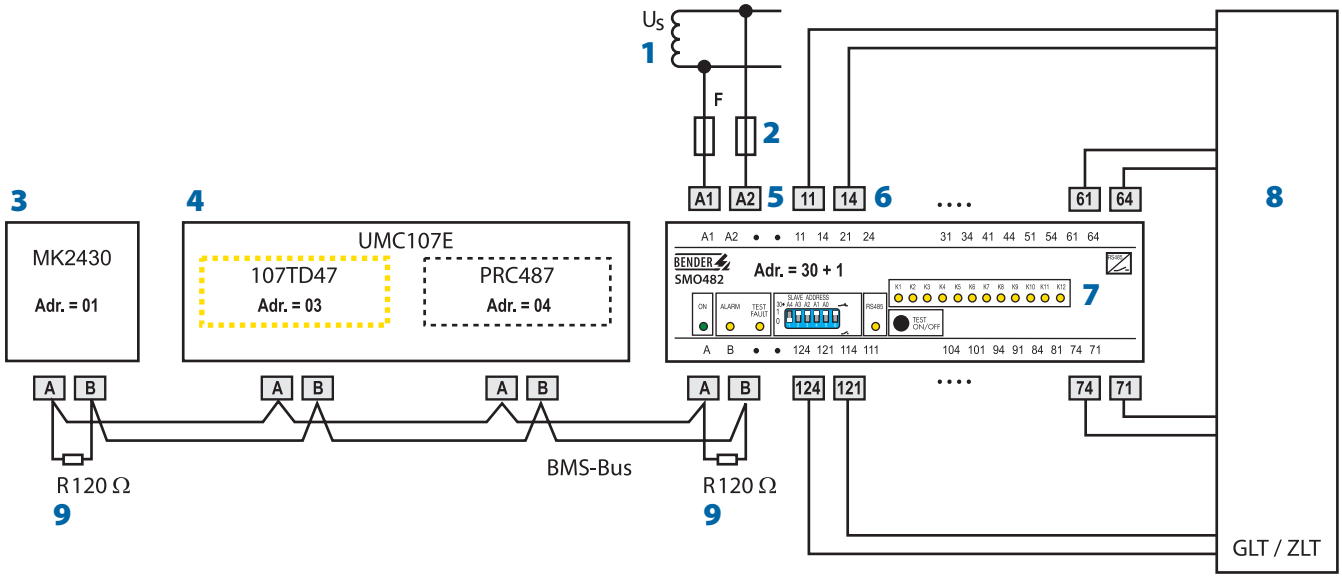
Dimension diagram X480

Dimensions are given in mm



2.5.1

Wiring diagram



1 - U_S (IT system)
2 - Short-circuit protection supply voltage 6 A fuse is recommended
3 - Alarm indicator and test combination MK2430
4 - Changeover and monitoring module UMC107E
5 - Power supply
6 - 11/14…121/124: Connection contact of the 12 alarm relays
7 - Signal converter SMO482P-12
8 - GLT = Building Control System ZLT = Central Control System
9 - Terminating resistor BMS bus

Technical data signal converter SMO482P-12

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3
Supply voltage	
Supply voltage U_S	AC 230 V
Frequency range U_S	50…60 Hz
Operating range U_S	0.8…1.15 x U_S
Power consumption	≤ 8 VA

Displays

LEDs	16 (ON, Alarm, TEST/FAULT, RS-485, K1…K12)

Operating elements

Button	TEST ON/OFF

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor (connectable via DIP switch)	120 Ω (0.25 W)
Device address, BMS bus	30 + (1…30)
Factory setting device address	30 + 1;

Switching elements

Number	12 x 1 N/O contacts
Operating principle	N/C operation / N/O operation selectable
Factory setting	N/O operation

Contact data acc. to IEC 60947-5-1

Rated operational voltage U_e	AC 230 V / DC 220 V
Rated operational current I_e	AC 5 A / DC 0.2 A
Utilization category	AC 14/DC 12
Electrical service life, number of cycles	10.000
Minimum contact load	1 mA at AC / DC > 10 V

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use /transport/storage	3K5/2K3/1K4
Operating temperature	- 25 °C…+ 55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use/transport/storage	3M4/2M2/1M3
Operating mode	continuous operation
Mounting	any position
Connection	screw-type terminals
Connection properties	
rigid/flexible/conductor sizes	0.2…4/0.2…2.5 mm²/AWG 22-12
flexible with ferrule, without/with plastic sleeve	0.25…2 mm²
Stripping length	8 mm
Tightening torque	0.5 Nm
Degree of protection, internal components (IEC 60529)	IP 30
Degree of protection, terminals (IEC 60529)	IP 20
Type of enclosure/dimension diagram	X470
Screw mounting	2 x M4
DIN rail mounting acc. to	IEC 60715
Flammability class	UL94V-0
Product standards	DIN EN 50178 for AC 230 V
Operating manual	BP108014
Weight	≤ 580 g

Accessories
Protocol converter for BMS, standard field bus systems and Ethernet networks

Chapter 2.5

The protocol converters of the FTC series allow easy connection of Bender monitoring systems utilising a BMS bus to standard fieldbus systems.

Protocol converter FTC470XET

Protocol converter to interface the BMS bus with TCP/IP via Ethernet

FTC470XET

Device features

- Display of BMS data via standard web browser
- Fast and easy parameterization of Bender systems from a central point
- Display of current operating and alarm messages and measured values
- Detailed information at a glance
- Display of historical data
- Useful data logger function
- OPC interface for communication with higher-level systems (building management systems or visualization software)
- Easy installation and commissioning
- E-mail notification in case of alarm and system faults
- Remote maintenance and remote diagnosis per LAN, WAN or Internet
- Independent of hard and software

Product description

The protocol converter FTC470XET is designed to be used as Ethernet gateway with web server. It converts data from the BMS bus into TCP/IP protocol (Ethernet). In this way, data from BMS systems can be displayed on a personal computer via a web browser. Additional software need not to be installed.

Application

- Conversion of BMS data into TCP/IP protocol (Ethernet)
- Setting, observing and analysing of Bender products with communication capabilities, such as RCMS, EDS and MEDICS® systems.
- Data transmission to building services management systems and visualization systems via an integrated OPC interface.

Function

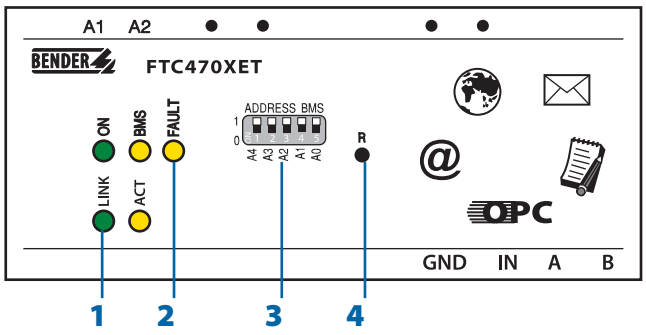
The protocol converter FTC470XET can be integrated into existing EDP systems like a personal computer. After entering an IP address and connection to the network and to a BMS system, a standard web browser (e.g. Internet Explorer, Netscape Navigator) of a personal computer allows access to the entire data of a BMS system. In this way, all important measuring data of the system are directly available. The parameterization of the Bender systems is protected by a password.

Approvals

AE25

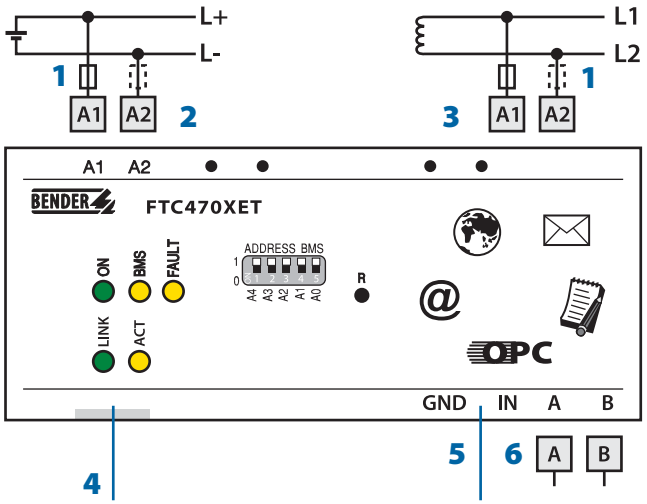
2.5.2

Operating elements



1 - Ethernet status indication
2 - BMS bus status indication
3 - DIP switches for binary BMS bus address setting: 1…30
4 - Reset button “R”

Wiring diagram



1 - U_S see ordering information, 6 A fuse recommended
2 - System U_S = DC 85…276 V
3 - System U_S = AC 85…276 V
4 - Ethernet connection RJ45
5 - Digital input to restore factory settings
6 - BMS bus connection

Technical data protocol converter FTC470XET

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Supply voltage

Supply voltage U_S	see ordering information
Frequency range of U_S	DC, 50…400 Hz
Power consumption	≤ 12 VA

Interfaces

BMS

Interface/protocol	RS-485/BMS (internal)
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Mode	Master/Slave
Connection	terminals A/B
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	DIP switch 1…30
Alarm LEDs	ON/FAULT/BMS
Factory setting, device address	1

Ethernet

Interface/protocol	Ethernet 10-base-T/TCP/IP
Connection	RJ45
Baud rate	10 Mbit/s
Alarm LEDs	Link/Act

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Long-time storage	1K4
Operating temperature	-10 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M2
Long-time storage	1M3
Operating mode	continuous operation
Mounting	any position
Connection	screw-type terminals
Connection properties	
rigid/flexible/conductor sizes	0.2…4/0.2…2.5 mm²/AWG 22-12
flexible with ferrule, without/with plastic sleeve	0.25…2 mm²
Stripping length	8 mm
Tightening torque	0.5 Nm
Degree of protection, internal components (IEC 60529)	IP 30
Degree of protection, terminals (IEC 60529)	IP 20
Type of enclosure/dimension diagram	X470
Screw mounting	2 x M4
DIN rail mounting acc. to	IEC 60715
Flammability class	UL94V-0
Operating Manual	TGH1375
Weight	≤ 400 g

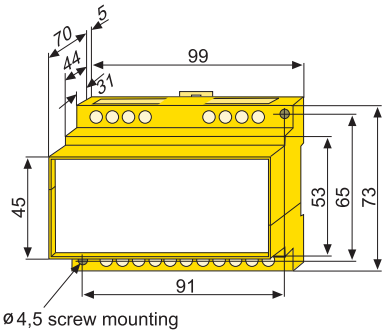
Ordering information

Type	Supply voltage U_S	Art. No.
FTC470XET	AC/DC 85…276 V*	B 9506 1001

*Absolute value

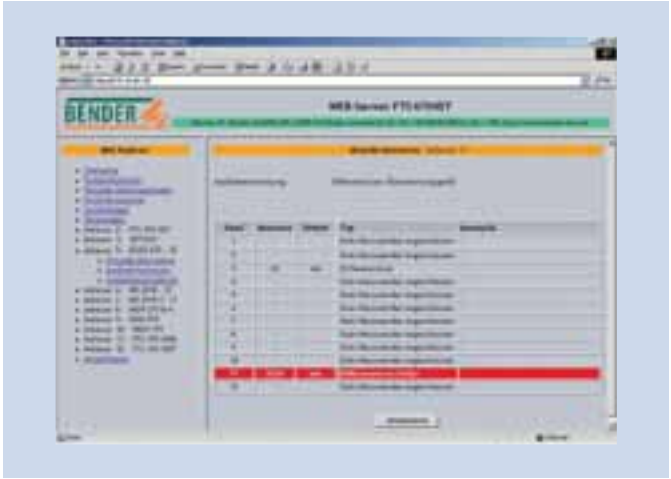
Dimension diagram X470

Dimensions are given in mm

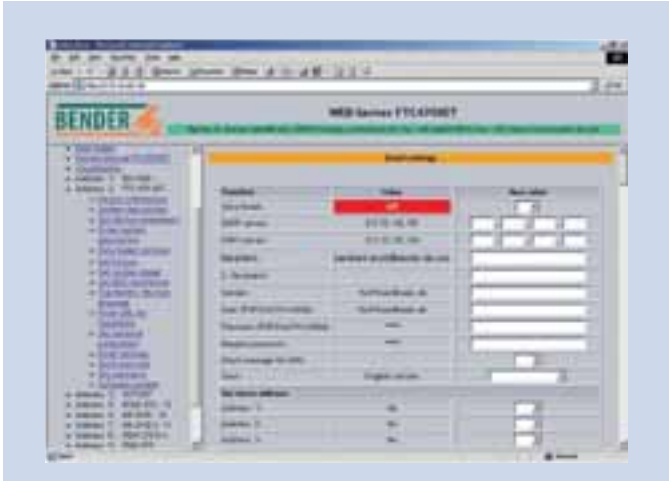


Visualization of BMS data

FTC470XET display: currently measured values of a BMS device



FTC470XET display: E-mail function setting



2.5.2

Protocol converter FTC470XMB

Protocol converter to interface the BMS bus with Modbus RTU

FTC470XMB

Device features

- Modbus-RTU interface for communication with higher-level systems (building management systems or visualization software)

Product description

The protocol converter FTC470XMB is designed to transmit data from the BMS bus to the Modbus RTU and vice versa. In this way, information from communication-capable Bender products, such as EDS, RCMS or MEDICS® systems can be integrated into a Modbus RTU system. Programming and adaptations on the Modbus RTU side have to be carried out by the user. In mode 1, up to 10 BMS-compatible Bender devices can be displayed with one FTC470XMB.

Application

- Transmitting all BMS data to Modbus RTU
- Displaying Bender data on Modbus-RTU-compatible software
- Reactions on the Modbus RTU side to BMS events
- Control of BMS systems via Modbus RTU
- Connection to Modbus-RTU-compatible building services management systems
- Reactions on the BMS side to events on the Modbus RTU side

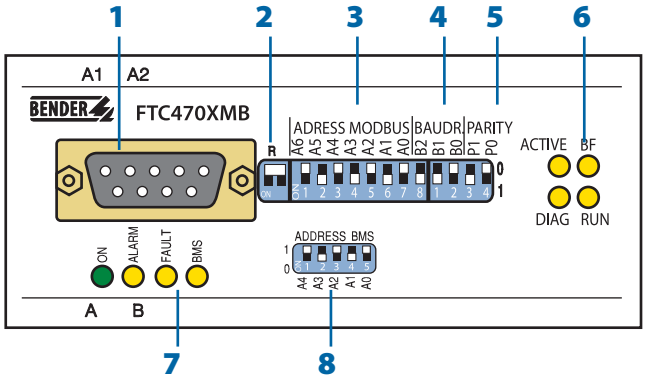
Function

The protocol converter FTC470XMB is incorporated into the Modbus RTU network as a slave and in a BMS system either as a master or a slave. The Modbus RTU master, e.g. a personal computer utilising a Modbus RTU interface or a PLC must be programmed in a way that the protocol converter is capable of triggering the respective requests and getting the replies. For appropriate programming, the user is required to have a thorough Modbus RTU knowledge. The entire command syntax is a component of the FTC470XMB operating manual.

Approvals

2.5.2

Operating elements



1 - Socket for Modbus RTU cable: 9-pin SUB-D

2 - Micro switch for Modbus RTU termination: "ON" = terminating resistor activated

3 - DIP switches for binary addressing of Modbus RTU: 1…127

4 - DIP switches for binary baud rate setting of Modbus RTU: 1200…57600 bit/s

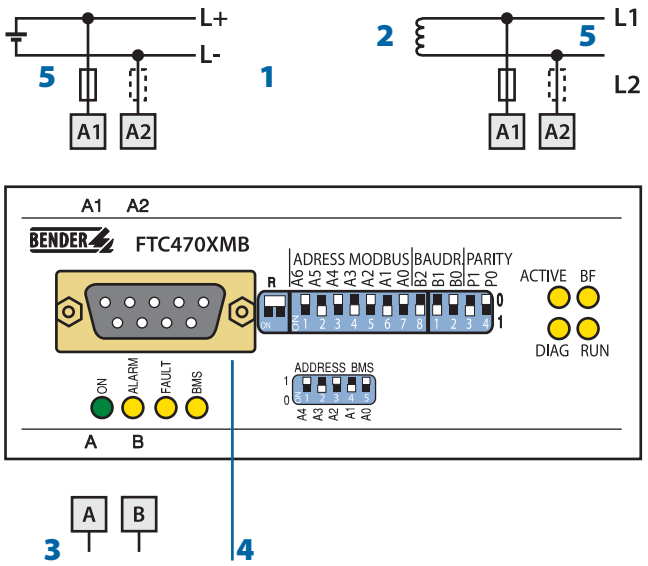
5 - DIP switches for binary parity setting of Modbus RTU: none/even/odd

6 - Modbus RTU status indication

7 - BMS bus status indication

8 - DIP switches for binary BMS bus address setting: 1…30

Wiring diagram



1 - System connection U_S = DC 85…276 V

2 - System connection U_S = AC 85…276 V

3 - BMS bus connection

4 - Modbus-RTU 9-pin SUB-D

5 - U_S see ordering information, 6 A fuse recommended

Technical data protocol converter FTC470XMB

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Supply voltage

Supply voltage U_S	see ordering information
Frequency range of U_S	DC, 50…400 Hz
Power consumption	≤ 12 VA

Interfaces

BMS

Interface/protocol	RS-485/BMS (internal)
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Mode	Master/Slave
Connection	terminals A/B
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	DIP switch 1…30
Alarm LEDs	ON/Alarm/FAULT/BMS

Modbus

Interface/protocol	RS-485/Modbus RTU
Mode	Modbus RTU slave
Connection	9-pin SUB-D
Alarm LEDs	Active/bus error/Diag/Run
Baud rate	1.2…57.6 kbit/s
Terminating resistor	DIP switch
Address assignment Modbus RTU	DIP switches 1…127

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Long-time storage	1K4
Operating temperature	-10 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M2
Long-time storage	1M3
Operating mode	continuous operation
Mounting	any position
Connection	screw-type terminals
Connection properties	
rigid/flexible/conductor sizes	0.2…4/0.2…2.5 mm²/AWG 22-12
flexible with ferrule, without/with plastic sleeve	0.25…2 mm²
Stripping length	8 mm
Tightening torque	0.5 Nm
Degree of protection, internal components (IEC 60529)	IP 30
Degree of protection, terminals (IEC 60529)	IP 20
Type of enclosure/dimension diagram	X470
Screw mounting	2 x M4
DIN rail mounting acc. to	IEC 60715
Flammability class	UL94V-0
Operating Manual	TGH1367
Weight	≤ 360 g

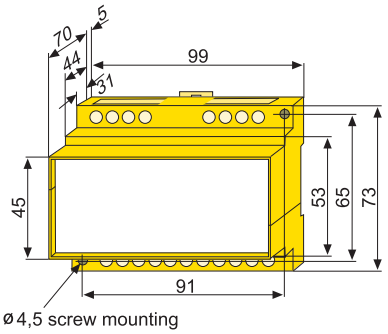
Ordering information

Type	Supply voltage U_S	Art. No.
FTC470XMB	AC/DC 85…276 V*	B 9506 1002

*Absolute value

Dimension diagram X470

Dimensions are given in mm



2.5.2

Protocol converter FTC470XDP

Protocol converter to interface the BMS bus to the PROFIBUS DP

FTC470XDP

Device features

- PROFIBUS-DP interface for communication with higher-level systems (building management systems or visualization software)

Product description

The protocol converter FTC470XDP is designed to transmit data from the BMS bus to the PROFIBUS DP and vice versa. In this way, information from communication-capable Bender products, such as EDS, RCMS or MEDICS® systems can be integrated into a PROFIBUS DP system. Programming or adaptations on the PROFIBUS DP side have to be carried out by the user.

Application

- Converting BMS data into PROFIBUS DP data
- Setting, observing and analysing of Bender products with communication capabilities, such as RCMS, EDS and MEDICS® systems.
- Transmitting all BMS data to PROFIBUS DP
- Displaying Bender data on PROFIBUS-compatible software
- Reactions on the PROFIBUS side to BMS events
- Connection to PROFIBUS-compatible building services management systems
- Reactions on the BMS side to events on the PROFIBUS DP side

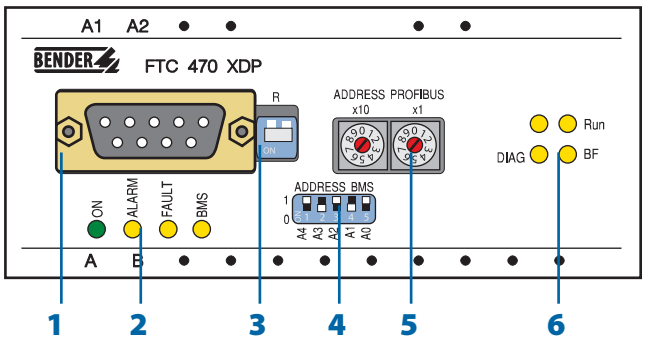
Function

The protocol converter FTC470XDP is incorporated into the PROFIBUS DP system as a slave and into a BMS system either as a master or a slave. The PROFIBUS DP master, e.g. a personal computer utilising a PROFIBUS card or a PLC must be programmed in a way that the protocol converter is capable of triggering the respective requests and getting replies. For appropriate programming, the user is required to have a thorough PROFIBUS DP knowledge. The necessary documentation together with the entire command syntax is a component of the FTC470XDP manual.

Approvals

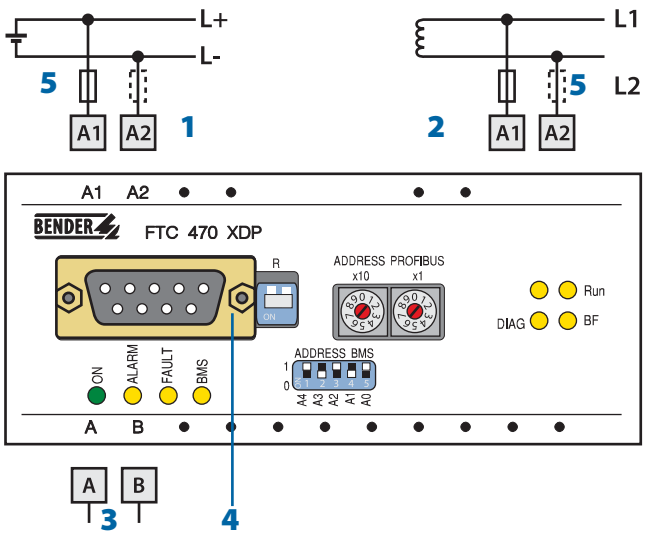
2.5.2

Operating elements



1 - Socket for PROFIBUS cable: 9-pin SUB-D
2 - BMS bus status indication
3 - Micro switch for PROFIBUS DP termination: "ON" = terminating resistor activated
4 - Switch for BMS bus address setting: Switch for BMS bus address setting 1…30
5 - Rotary switch for PROFIBUS DP address setting: 1…99
6 - PROFIBUS DP status indication

Wiring diagram



1 - System connection U_S = DC 85…276 V
2 - System connection U_S = AC 85…276 V
3 - BMS bus connection
4 - PROFIBUS DP 9-pin SUB-D
5 - U_S, see ordering information, 6 A fuse recommended)

Technical data protocol converter FTC470XDP

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Supply voltage

Supply voltage U_S	see ordering information
Frequency range U_S	DC 50…400 Hz
Power consumption	≤ 12 VA

Interfaces

BMS

Interface/protocol	RS-485/BMS (internal)
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Mode	Master/Slave
Connection	terminals A/B
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	DIP switch 1…30
Alarm LEDs	ON/Alarm/FAULT/BMS

PROFIBUS DP

Interface/protocol	RS-485/PROFIBUS DP
Mode	PROFIBUS DP slave
Connection	9-pin SUB-D
Alarm LEDs	Run/Diag/bus error
Baud rate	9.6 kBit/s…12 Mbit/s automatic recognition
Terminating resistor	DIP switch
Address setting PROFIBUS DP	rotary switch, 1…99

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Long-time storage	1K4
Operating temperature	-10 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M2
Long-time storage	1M3
Operating mode	continuous operation
Mounting	any position
Connection	screw-type terminals
Connection properties	
rigid/flexible/conductor sizes	0.2…4/0.2…2.5 mm²/AWG 22-12
flexible with ferrule, without/with plastic sleeve	0.25…2 mm²
Stripping length	8 mm
Tightening torque	0.5 Nm
Degree of protection, internal components (IEC 60529)	IP 30
Degree of protection, terminals (IEC 60529)	IP 20
Type of enclosure/dimension diagram	X470
Screw mounting	2 x M4
DIN rail mounting acc. to	IEC 60715
Flammability class	UL94V-0
Operating Manual	TGH1358
Weight	≤ 360 g

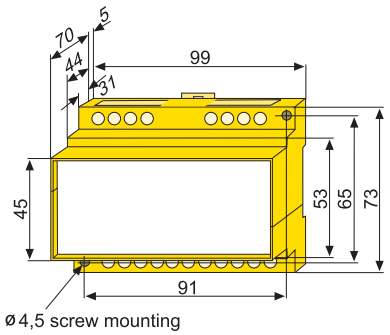
Ordering information

Type	Supply voltage U_S	Art No.
FTC470XDP	AC/DC 85…276 V*	B 9506 1000

*Absolute value

Dimension diagram X470

Dimensions are given in mm



2.5.2

Protocol converter DI400

Protocol converter DI400

Device features

- Display of operating status and alarm messages from Bender monitoring systems
- A set of LEDs, red, yellow and green, allowing messages to be indicated in an order of priority
- 1000 freely programmable message texts
- Memory with real-time clock to store 1000 alarm messages with date and time stamp
- 16 digital inputs (option)
- 1 programmable relay (option)
- Non-reflecting, multicoloured foil
- Smooth surfaces without openings to meet the hygiene requirements for medical locations

Product description

The protocol converter DI400 is an expansion module for Bender monitoring systems to exchange data via the BMS bus. It permits a doubling of the internal BMS bus address range 2…150 for address connection to the TM800 operator panel or an MK800 alarm indicator and test combination.

Function

The DI400 is connected to the TM800 operator panel or MK800 via the external BMS bus. The first devices of the address range 2…150 are connected to the internal BMS bus of the TM800 operator panel or the MK800 alarm indicator test combination. Additional devices can be connected to the internal interface of DI400. All operating, warning and fault messages of the devices connected to DI400 are collected and can be accessed and indicated via the external interface of TM800 operator panel or MK800.

The DI400 is mounted into an enclosure suitable for wall mounting.

History memory

The DI400 stores up to 1000 messages with date and time in the history memory (ring buffer). When more than 1000 messages are recorded by DI400, the 1001th message overwrites entry 1. The history memory can be read out with the PC software via USB interface or the BMS bus.

Programming

The DI400 is capable of transmitting messages without the need for additional parameter setting. If, however, the history memory is used, the respective messages have to be parameterised with TMK-SET, in the same way as MK800.

Settings

The address of the external BMS interface of the DI400 is factory set to 2. The address can be set via a DIP switch or by parameterization (TMK-SET).

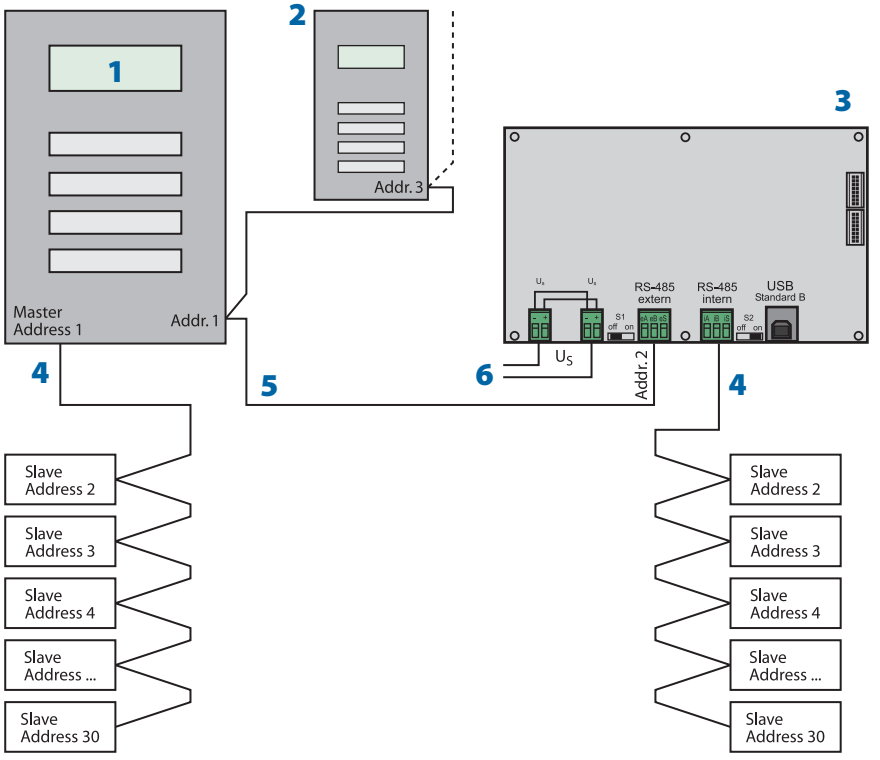
On the internal BMS bus, the DI400 always is the master and has address 1.

Ordering information

Type	Digital inputs	Enclosure	Art. No.
DI400-11	16	surface mounting	B 9510 0113
DI400-12	--	surface mounting	B 9510 0114

2.5.2

Wiring diagram



1 - TM operator panel or MK800 alarm indicator and test combination

2 - TM operator panel or MK800 alarm indicator and test combination

3 - BMS expansion module DI400

4 - Internal BMS bus

5 - External BMS bus

6 - Connection to supply voltage U_S

Note: Terminate both ends of the BMS bus with 120 Ω resistors (R).

Technical data protocol converter DI400

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Supply voltage

Supply voltage U_S	AC / DC 24 V
Frequency range U_S	0/40…60 Hz
Operating range U_S	AC 18…28/DC 18…30 V
Power consumption	≤ 5 VA

History memory

Standard message texts in	20 languages
Alarm addresses	< 300
Programmable text messages	1000
History memory (messages)	1000
Standard text message	3 x 20 characters
Additional text message	3 x 20 characters
Alarm LEDs (three different colours)	NORMAL (green) WARNING (yellow) ALARM (red)

Buzzer

Buzzer message	can be acknowledged, adoption of characteristics of new values
Buzzer interval	configurable
Buzzer frequency	configurable
Buzzer repetition	configurable

Inputs (option)

Digital inputs	16 (IN1…IN16)
Galvanic separation	yes
Control of digital inputs via voltage-free contacts/extraneous voltage	
Operating principle N/O or N/C operation / Off	can be selected for each input
Factory setting	Off
Voltage range (high)	AC / DC 10…30 V
Voltage range (low)	AC / DC 0…2 V

Interface internal/external

Interface/protocol	2 x RS-485/BMS / USB
Baud rate internal/external (default setting)	9.6 kBit/s/57.6 kbit/s
Cable length	≤1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W) connectable via DIP switch
Device address, BMS bus internal/external	1(…150)/1…99
Factory setting device address internal/external	1 (master)/1 (master)

Programming

Interfaces	RS-485 / BMS / USB
Software TMK-Set	V 3.0 and higher
Factory setting password query	activated
Cable length when the power supply for the DI400 is taken from AN450	
0.28 mm²	50 m
0.5 mm²	90 m
0.75 mm²	150 m
1.5 mm²	250 m
2.5 mm²	400 m

Colours

Front foil	RAL 7035 (light grey) / RAL 7012 (basalt grey)
Front plate	RAL 7035 (light grey)

Switching elements

Number of changeover contacts					1 (DI400 only)
Operating principle					N/C or N/O operation (programmable)
Electrical service life, number of cycles					10.000
Contact data acc. to IEC 60947-5-1					
Utilization category	AC-13	AC-14	DC-12	DC-12	DC-12
Rated operational voltage	24 V	24 V	24 V	24 V	24 V
Rated operational current	5 A	3 A	1 A	0.2 A	0.1 A
Minimum contact load					1 mA at AC / DC > 10 V

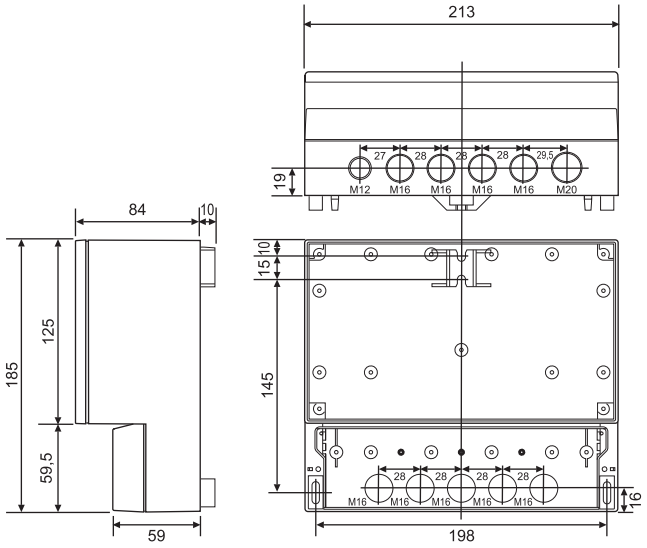
General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Operating temperature	- 5…+ 55 °C
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Storage	1K4
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M2
Long-time storage	1M3
Operating mode	continuous operation
Mounting	any position
Connection	plug-in terminals
Connection properties (supply voltage, BMS bus)	
rigid / flexible / conductor sizes	0.2…2.5/0.2…2.5 mm²/AWG 24-12
flexible with ferrule without/with plastic sleeve	0.25…2.5/0.25…2.5 mm²
Connection properties (inputs)	
rigid / flexible / conductor sizes	0.08…1.5/0.08…1.5 mm²/AWG 28-16
flexible with ferrule without / with plastic sleeve	0.25…1.5/0.25…0.5 mm²
Stripping length	7 mm
Tightening torque	0.5…0.6 Nm
Degree of protection, internal components (DIN EN 60529)	IP50
Degree of protection, terminals (IEC 60529)	IP20
Flammability class	UL94V-0
Product standards	IEC 60364-7-710
Operating manual	
Weight	< 880 g

2.5.2

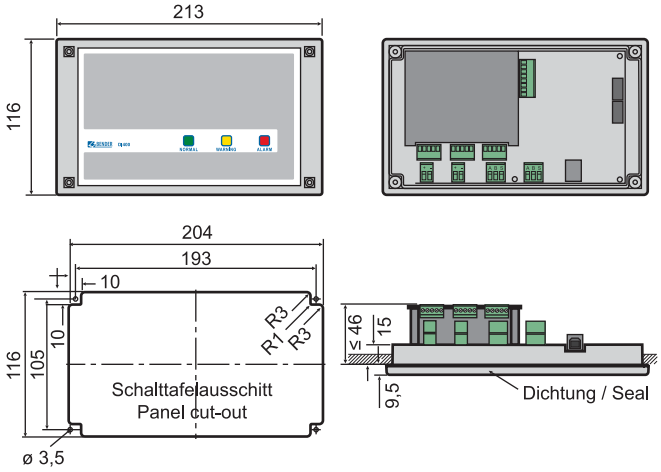
Dimension diagram DI400-11/DI400-12, surface mounting

Dimensions are given in mm



Dimension diagram DI400-11/DI400-12, example: door mounting

Dimensions are given in mm



2.5.2

Accessories
Protocol converter und repeaters

Chapter 2.5

Repeaters and interface converters are capable of converting predefined interface variations into different interface variations.

RS-485 interface repeater DI-1PSM

RS-485 interface repeater DI-1PSM

Device features

- Plastic enclosure for DIN rail mounting
- Adjustable baud rate
- Galvanic separation between the input and output circuit and the power supply
- Supply voltage AC/DC 24 V ± 20 %

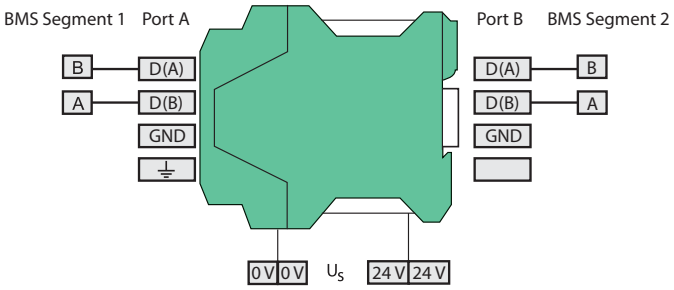
Product description

The RS-485 interface repeater DI-1PSM is designed for signal amplification on the RS-485 interface (BMS bus). This is required when the network distance exceeds a length of 1200 m and when more than 32 bus nodes exist.

Application

- Extension of the maximum possible bus length by 1200 m in BMS systems (EDS, RCMS, MEDICS® systems)
- Increasing the maximum possible bus nodes above 32
- Protection against spikes by galvanic separation between the input and output circuit and the power supply

Wiring diagram



Note:

- Attention should be paid to the BMS bus termination

Technical data RS-485 interface repeater DI-1PSM

Insulation coordination acc. to IEC 60664-1

Rated voltage	
Rated impulse voltage/pollution degree	2 kV/3

Supply voltage

Supply voltage U_S	see ordering information
Power consumption	90 mA

Interfaces

BMS

Interface/protocol	2 x RS-485 / BMS
Baud rate adjustable via DIP switch	4.8…1500 kbit/s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Operating mode	half-duplex
Change of data direction	automatic data direction control
Cascading capability	9 (4.8…93.75 kbit / s)
Terminating resistor, selectable via DIP switch	220 Ω
Device address, BMS bus	--
Alarm LEDs	ON (green), R x D (green), T x D (yellow)

General data

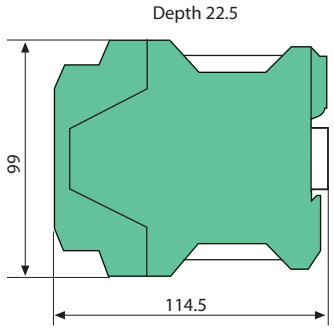
EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 50081-1
Classification of climatic conditions IEC 60721	
Stationary use	3K5
Transport	2K3
Storage	1K4
Operating temperature	0 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M2
Storage	1M3
Operating mode	continuous operation
Mounting	any position
Connection	screw-type terminals
Connection properties	
rigid/flexible/conductor sizes	0.2…2.5 mm²/AWG 24…12
Degree of protection, internal components (IEC 60529)	IP 30
Degree of protection, terminals (IEC 60529)	IP 20
DIN rail mounting acc. to	IEC 60715
Operating manual	TBP501012
Weight	≤ 130 g

Ordering information

Type	Supply voltage U_S	Art. No.
DI-1PSM	AC/DC 24 V ± 20 %	B 9501 2044

Dimension diagram DI-1PSM

Dimensions are given in mm



2.5.3

Interface converter DI-2

Interface converter DI-2

Device features

- Plastic enclosure for DIN rail mounting
- Electrical separation between the input and output circuit
- Supply voltage DC 10…30 V

Product description

The DI-2 converter is capable of connecting personal computers and workstations utilizing an RS-232 interface with Bender devices utilizing an RS-485 interface. The hardware and software of the computers need not to be changed. A typical application is the connection of a personal computer to a BMS network.

Application

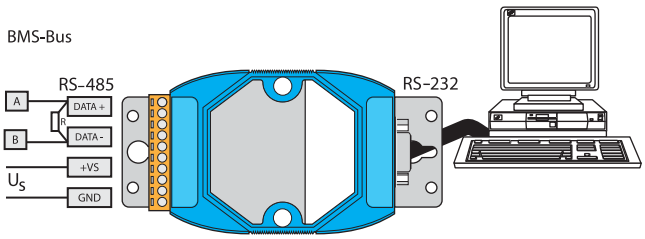
- RS-232 signals are converted into RS-485 signals
- Parameterization of alarm indicator and operator panels (MK800, MK2430) with RS-485 interface via PC with RS-232 interface using software

Function

Many PCs and work stations are equipped with serial RS-232 interfaces. The interface converter DI-2 is designed to connect these devices via an RS-232 interface to the BMS bus using the RS-485 standard.The connected devices are protected against spikes by galvanic separation between the input and output circuit. Additional internal measures protect the device against voltage spikes.

Approvals

Wiring diagram (example)



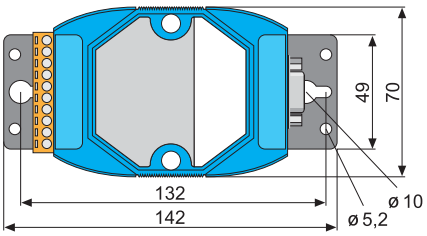
DI-2 for the integration of a personal computer utilizing an RS-232 interface into a BMS network.

Note:

- Terminate both ends of the BMS bus with 120 Ω resistors (R).

Dimension diagram DI-2

Dimensions are given in mm



Ordering information

Type	Supply voltage U_S	Art. No.
DI-2	DC 10…30 V*	B 9501 2022

* Absolute values

Technical data DI-2 interface converter

Insulation coordination acc. to IEC 60664-1

Rated voltage	
Rated impulse voltage/pollution degree	3 kV/3

Supply voltage

Supply voltage U_S	see ordering information
Power consumption	≤ 2.2 W

Interfaces

BMS

Interface/protocol	1 x RS-485/--
Baud rate	9.6…115.2 kbit/s
Cable length	≤1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Mode	--
Connection	DATA + (A), DATA - (B)
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	--
Serial interface	1 x RS-232
Alarm LEDs	ON

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	Stationary use 3K5
Transport	2K3 Storage
	1K4
Operating temperature	-10 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M2
Storage	1M3
Operating mode	continuous operation
Mounting	any position
Connection	screw-type terminals
Connection rigid/flexible/conductor sizes	0.5…2.5 mm²/AWG 22…12
Degree of protection, internal components (IEC 60529)	IP 30
Degree of protection, terminals (IEC 60529)	IP 20
Screw mounting	2 x M3
DIN rail mounting acc. to	IEC 60715
Operating Manual	BP109010
Weight	≤ 160 g

Interface converter DI-2USB

Interface converter DI-2

Device features

- Plastic enclosure
- Galvanic separation between the input and output circuit
- Power supply via USB port
- USB cable and driver CD included in the scope of delivery

Product description

The DI-2USB interface converter is capable of connecting PCs and work stations via the USB interface to Bender devices utilizing an RS-485 interface. The hardware and software of the computers need not to be changed. A personal computer can be connected to a BMS network via the DI-2USB converter, for example.

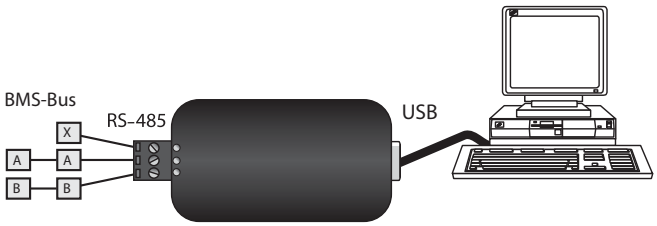
Application

- Conversion of USB interface into RS-485 interface
- Parameterization of alarm indicator and operator panels (MK800, MK2430) utilizing an RS-485 interface via PC utilizing a USB interace using software

Function

Many PCs and work stations are equipped with USB interfaces. The DI-2USB interface converter is designed to connect these devices via a USB interface to the BMS bus using the RS-485 standard. The connected devices are protected against spikes by electrical separation between the input and output circuit (DC 3000 V). Additional internal measures protect the device against voltage spikes. Driver for Windows 98, ME, 2000, XP, Linux (Kernel 2.4.18 and higher)

Wiring diagram (example)



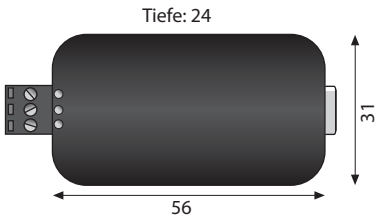
DI-2USB for the integration of a personal computer utilizing a USB interface into a BMS network.

Note:

- Attention should be paid to the BMS bus termination

Dimension diagram DI-2

Dimensions are given in mm



Ordering information

Type	Supply voltage	Art. No.
DI-2USB	supplied by the USB port, no additional power supply required.	B 9501 2045

*Absolute value

Technical data interface converter DI-2USB

Insulation coordination acc. to IEC 60664-1

Rated voltage	
Rated impulse voltage/pollution degree	3 kV/3

Supply voltage

Supply voltage U_S	see ordering information
Power consumption	95 mA

Interfaces

BMS

Interface/protocol	1 x RS-485/--
Baud rate	9.6…115.2 kbit/s
Cable length	≤1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Mode	--
Connection	A, B
Integrated terminating resistors, selectable via jumper	
Factory setting	terminating resistors included
Device address, BMS bus	--
Serial interface	1 x USB
Alarm	ON (yellow) Data (green), T x Data (red)

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Storage	1K4
Operating temperature	-10 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M2
Storage	1M3
Operating mode	continuous operation
Mounting	any position
Connection	screw-type terminals/USB plug Type B
Connection rigid/flexible/conductor sizes	0.5…2.5 mm²/AWG 22…12
Screw mounting	2 x M3
DIN rail mounting acc. to	IEC 60715
Operating manual	manual of third-party manufacturer
Weight	≤ 25 g

Accessories
Visualization

Chapter 2.5

There are several ways to visualise data from Bender monitoring systems. There is a wide range of visualization tools ranging from comprehensive SCADA software to visualization via a standard web browser.

Axeda Supervisor

Software for the visualization of data from Bender systems

Axeda Supervisor

Device features

- Easy representation of Bender monitoring systems on standard computers (PC)
- Application-specific graphic visualization
- Presentation in website format
- Advanced alarm handling
- Alarm lists, history memory, diagrams
- Customer-specific programming services

Product description

Axeda Supervisor is a powerful software for the visualization of Bender systems utilising a BMS interface via gateways on a standard PC. For this purpose, the computers are equipped with a Runtime version of the Axeda Supervisor software. Suitable gateways are FTC470XET, FTC470XMB and the BMS OPC server. Axeda Supervisor runs under the operating systems Windows NT, Windows 2000 und Windows XP Professional.

There are different versions of Axeda Supervisor available:

- Demo version
- System Integrator Kit with a two-hour development time
- Development versions for 100, 300, 500, 2000,10000 and 65000 application tags
- Runtime versions for 100, 300, 500, 2000,10000 and 65000 application tags

The version is determined via a dongle for USB or the parallel port.

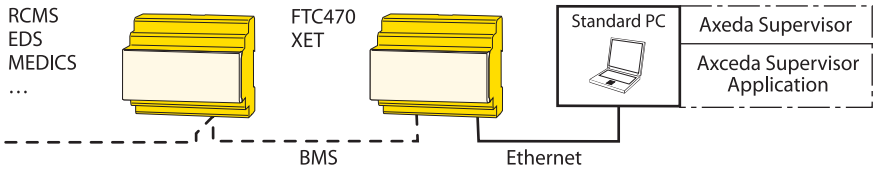
It can also be run on a Touch Panel.

Communication structure

Suitable data sources are Bender gateways FTC470XET, FTC470XMB and the BMS OPC server.

FTC470XET:

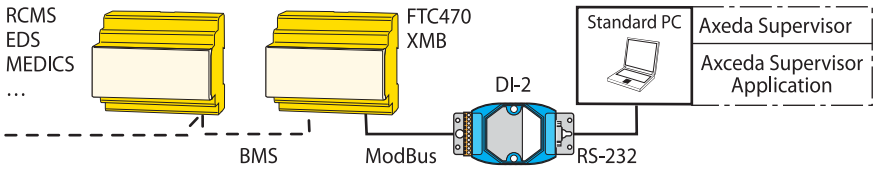
Alarms and measured values from Bender systems are passed to the internal OPC server which makes them available as OPC items. The software Axeda Supervisor installed on the PC contains an OPC client which receives the data from the OPC server. The graphics module of Axeda Supervisor allows application-specific data representation.



FTC470XMB:

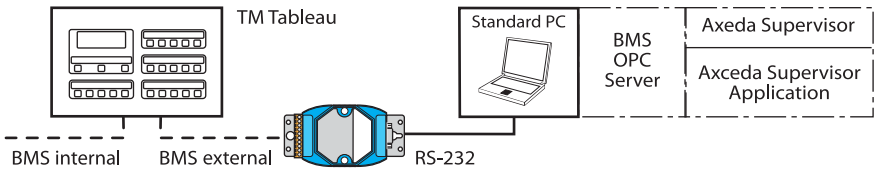
Alarms and measured values from Bender systems are converted into a Modbus RTU protocol and are stored in the registers of the FTC470XMB. In this way, one FTC470XMB can display data of 10 BMS-capable Bender devices.

The software Axeda Supervisor installed on the PC contains a Modbus RTU driver which, as a Modbus master, is capable of reading out data from the respective registers of the FTC470XMB. The graphics module of Axeda Supervisor allows application-specific data representation.



BMS OPC server:

The BMS OPC server is installed on a PC as software and connected to the Bender system via the DI-2 interface converter. Controlled by a configuration file, the OPC server only provides alarms from the external bus of the Bender system as OPC items. The software Axeda Supervisor installed on the PC contains an OPC client which receives the data from the OPC server. The graphics module of Axeda Supervisor allows application-specific data representation.



Programming check list

The visualization of a Bender system is not offered as a standard product with a specified scope of performance and price. However, for each case, application-specific configuration is required.

The Bender Service Department will guide you through each project phase starting from the first planning to the creation of customer-specific applications. The most important questions to be answered:

- Internal or external BMS bus
- Number and type of all connected BMS capable Bender devices
- Bender device addressing
- Selection of the appropriate gateway
- Gateway configuration
- Determination of the number of application tags required
- Selection of the PC and the appropriate operating system
- Selection of the Axeda Supervisor version based on the number of application tags
- Determination of suitable additional components, such as hubs or switches and cables
- Design of an application-specific representation
- Price calculation

Product overview	
Type	
Axeda	Demo version
	System Integrator Kit with a two-hour development time
Axeda development versions	
100 tags	
300 tags	
500 tags	
2000 tags	
10000 tags	
65000 tags	
Axeda Runtime versions	
100 tags	
300 tags	
500 tags	
2000 tags	
10000 tags	
65000 tags	
Scope of delivery	CD, Dongle
System requirements:	Windows 2000, XP
	• Intel or compatible processor providing at least 1 GHz clock frequency
	• At least 256 MB RAM
	• 500 MB of free hard disk space
	• CD Rom or DVD drive
	• Graphics card providing a storage space of 8 MB at least
	• Screen resolution of 800 x 600 pixels or higher
	• USB or printer connection for the dongle

Typical display

2.5.4

BMS OPC server

Software for connection of BMS systems with TM operator panels to third-party systems with OPC server

BMS OPC server

Features

- Standardised OPC interface between control and visualization
- Provides alarms and data from MEDICS® systems featuring TM operator panels
- OPC interface according to specification DataAccess (DA) 2.0, downward compatible DA 1.0
- Name space of flat design
- Items for alarm condition, measured value and operating messages
- Configuration via ASCII file
- Easy integration of data into GLT, SCADA or visualization software
- Uncomplicated installation into common personal computers
- Network compatible
- Complete solutions and services
- Access of an OPC client to several OPC servers
- Access of several OPC clients to one OPC server

Product description

The BMS OPC server is a software package that allows BMS systems like MEDICS®, RCMS or EDS to share data with external devices or networks such as building services management systems, SCADA system or visualization software. For this purpose, a personal computer with a built-in BMS OPC server has to be connected to the external BMS bus of TM operator panels. The BMS OPC server gets alarm messages and data from the external BMS bus and transmits them to suitable OPC clients.

Applications

- Provides alarms and data from BMS systems with TM operator panels at the standard OPC interface according to specification DataAccess 2.0
- Each building services management system (GLT) with integrated OPC client according to specification DataAccess 1 or 2 can receive data from the BMS OPC server
- Each visualization software with an integrated OPC client according to specification DataAccess 1 or 2 can receive and represent data from the BMS OPC server
- The configuration of the BMS OPC server is carried out via an ASCII file
- Provision of additional services: installation, configuration, commissioning
- Individual visualization with software package Axeda Wizcon on request
- Complete solutions on request

Function

The BMS-OPS server is controlled via the configuration file esbOPC.cfg. For each channel of any BMS device one line will be provided where specified items can be created. Items can be created for alarm state, measured value, type of measured value and operating message.

Minimum requirements for the installation of a BMS OPC server on a personal computer:

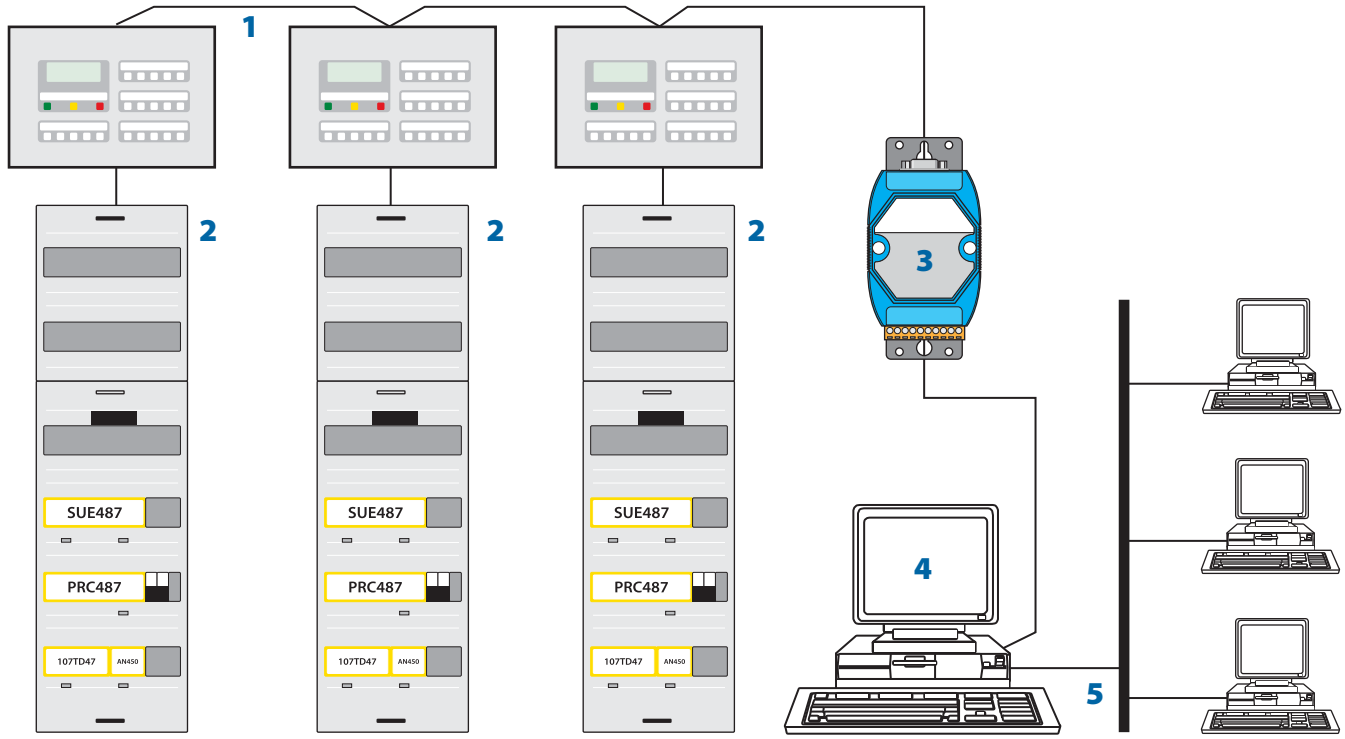
- Operating system Windows 2000 or Windows XP
- Serial RS-232 or USB interface
- 128 MB RAM
- 10 MB free hard disk space
- CD-ROM drive

Connection to the external bus of TM operator panels (RS-485 interface) requires an interface converter. Personal computers providing a serial RS-232 interface require an RS-232/RS-485 converter (e.g.type DI-2).

Alternatively, connection is possible via the PC's USB interface, when a USB/RS-485 converter is used.

The BMS OPC server, a program that runs in the background invisibly for the user, does not have a menu-assisted interface. The BMS OPC server's data will only become visible via an OPC client as counterpart. The integrated OPC clients of the GLT or visualization software display the corresponding data within the graphics modules. For test purposes, OPC Demo clients are recommended to be used, which are offered by several manufactureres free of charge (by Softing, Matrikon, WinTech, ICONICS, to name but a few). The CD-ROM with the BMS OPC server also includes the Softing Demo client.

Wiring diagram



The BMS OPC server in practical use:
MEDICS® systems featuring TM operator panels and changeover modules are connected to a personal computer via an interface converter. A BMS OPC server is installed on the personal computer. GLT, SCADA or visualization software with OPC client can share one personal computer or can be installed on other personal computers in the LAN.

1 - External BMS bus
2 - Internal BMS bus
3 - DI-2 interface converter
4 - Personal computer with integrated BMS OPC server
5 - LAN

Technical data BMS OPC server

Designation	BMS OPC server
Operating system	Windows 2000, Windows XP
Data medium	CD-ROM
Scope of delivery	BMS OPC server, Softing Demo Client, User manual, example of configuration
OPC specification	DataAccess 2.0
Name space	of flat design
Items	alarm, value, message and operatin message items correspondingly
Data type items	configuration, 32 Bit Integer

Ordering information

Type	Art. No.
BMS OPC server on the data medium CD-ROM	B 9507 0001

Accessories

Type	Art. No.
Interface converter RS-232/RS-485, type DI-2	B 9501 2022
DI-3-Set (such as B 9501 2022, with power supply unit)	B 9501 2028
Services such as installation, configuration	on request
Complete package: Personal computer with BMS OPC server and interface converter	on request
Customer-specific visualization with Axeda Wizcon	on request

2.5.4

Accessories
Power supply units – Assembly kits

Power supply unit AN450

AN450

Device features

- Power supply unit for the supply of Bender devices with a supply voltage of AC 20 V and a total power consumption of maximum 9 VA
- Supply of maximum three alarm indicator and test combinations MK2430 / MK800, for example
- protected secondary circuit

Approvals

Product description

The power supply unit AN450 is designed to supply Bender devices with a supply voltage of AC 20 V and a total power consumption of maximum 9 VA.

A maximum of 3 alarm indicator and test combinations MK2430 / MK800 can be supplied, for example.

Function

The supply voltage AC 230 V will be connected to the terminals A1/A2. The output voltage AC 20 V is available across the terminals U2/V2. The unit features two input and output terminals, so that several AN450 can be connected in parallel, if required. The terminals A1/A2 and U2/V2 must not be interchanged.

The secondary circuit of the built-in safety transformer is protected by a PTC resistor.

Details about the cable length

The maximum number of devices that can be connected depends upon the loss of voltage in the line between AN450 and the device.

Please take the note of supply voltage ranges as well as the tolerance of the system voltage:

In case of long cables, check the value of the supply voltage across the terminals of the connected device. If the loss of voltage in the line is too great, a point-to-point connection is recommended.

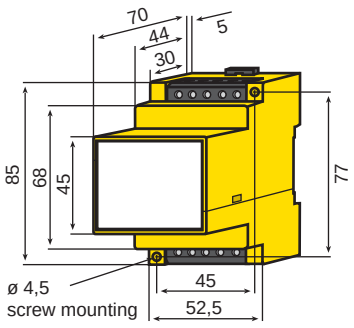
2.5.5

Ordering information

Type	Supply voltage U_S	Output voltage	Art. No.
AN450	AC 230 V, 50…60 Hz	AC 20 V, 50…60 Hz	B 924 201
AN450-133	AC 127 V, 50…60 Hz	AC 20 V, 50…60 Hz	B 924 203

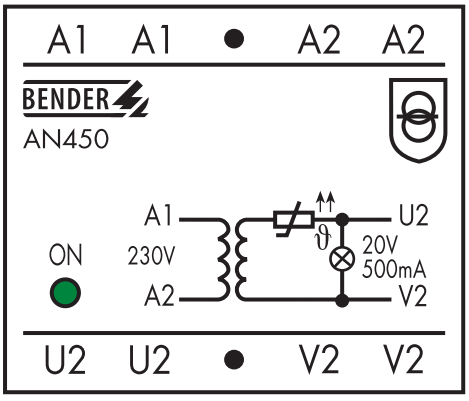
Dimension diagram X440

Dimensions in mm

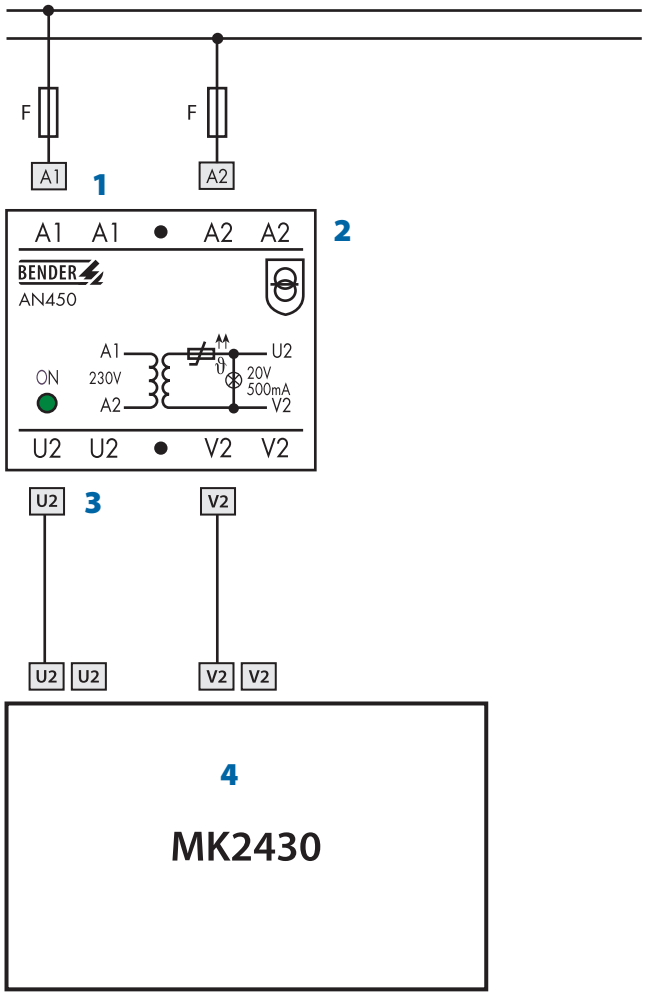


Operating elements

Operation LED (green) “ON” lights, when the device is in operating state.



Wiring diagram



1 - A1, A2 = supply voltage U_S; F = short circuit protection
2 - Power supply unit AN450
3 - U2, V2 = output voltage
4 - Alarm indicator and test combination

Technical data power supply unit AN450

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

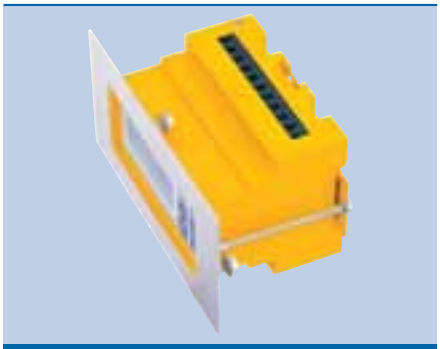
Voltage range

Supply voltage U_S	see ordering information
Frequency range U_S	see ordering information
Operating range U_S	0.85…1.1 x U_e
Power consumption	≤ 9 VA
Secondary voltage	AC 20 V, 50…60 Hz
Nominal secondary voltage	≤ 9 VA
Secondary protection	PTC resistors

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use /transport/storage	3K5/2K3/1K4
Operating temperature	- 5 °C…+ 50 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use/transport/storage	3M4/2M2/1M3
Operating mode	continuous operation
Mounting	any position
Connection	screw-type terminals
Connection properties	
rigid/flexible/conductor sizes	0.2…4/0.2…2.5 mm²/AWG 22-12
flexible with ferrule, without/with plastic sleeve	0.25…2 mm²
Stripping length	8 mm
Tightening torque	0.5 Nm
Degree of protection, internal components /terminal (DIN EN 60529)	IP 30 / IP 20
Type of enclosure/dimension diagram	X440
Screw mounting	2 x M4
DIN rail mounting acc. to	IEC 60715
Flammability class	UL94V-0
Product standards	DIN EN 60742; DIN EN 60742; DIN EN 61558-1; IEC 61558-1
Operating manual	BP203003
Weight	≤ 400 g

Enclosure mounting



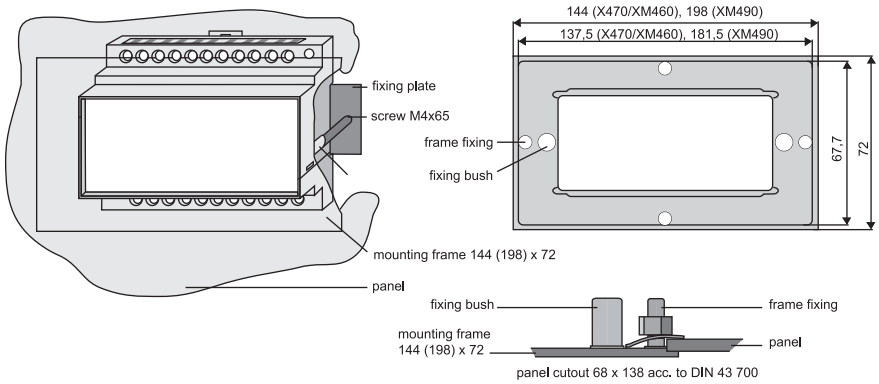
Mounting frame

Ordering information	
Type	**Art. No.**
X470 mounting frame	B 990 991
XM460 mounting frame	B 990 995
XM490 mounting frame	B 990 996

Mounting frame for enclosures to be installed into panels with standard cutout

For mounting X470/XM460 enclosures into standard panel cut-outs, 144 x 72 mm, aluminium silver anodized. Suitable for devices of the 470 and 460 series, for example IR470, EDS470, RCMS470, RCMS460 RCM470, RCMA470, RCMS460 and EDS460.

For mounting XM490 enclosures in panel cut-outs, 198 x 72 mm. Suitable for devices, for example RCMS490, EDS490/491. dimensions are given in mm.

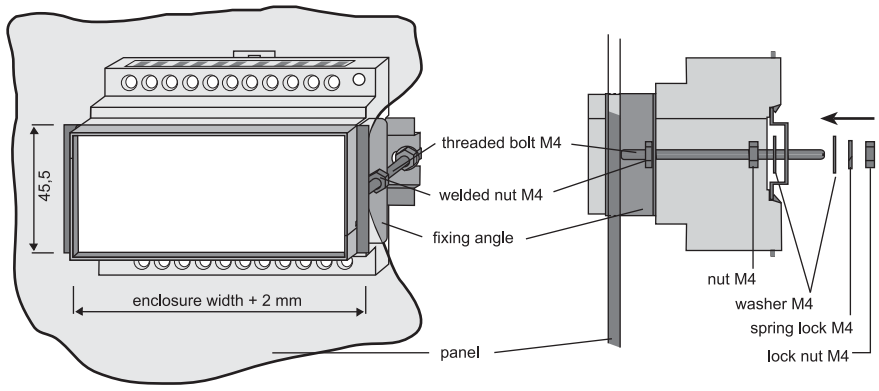


Mounting parts

Ordering information	
Type	**Art. No.**
X470 fixing set	B 990 990

Mounting set for enclosures to be installed into panels with 45 mm cutout

For mounting X440, X460, X470 enclosures into panel cutouts of 45 mm, made of stainless steel. Suitable for all devices of the 470 series, such as RCM470 and RCMA470, dimensions are given in mm.

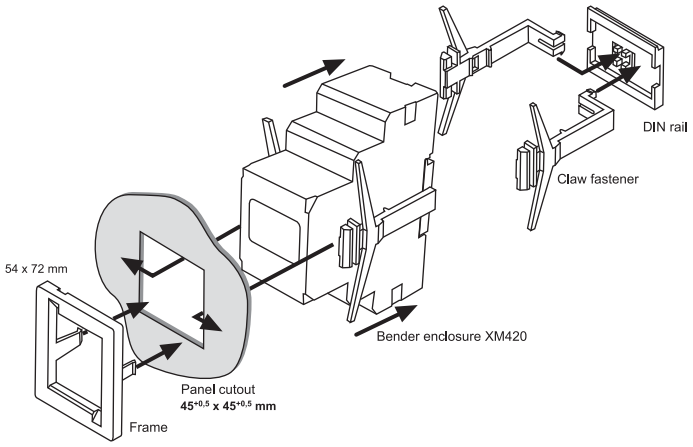


XM420 Mounting frame

Ordering information	
Type	**Art. No.**
XM420 mounting frame	B 990 994

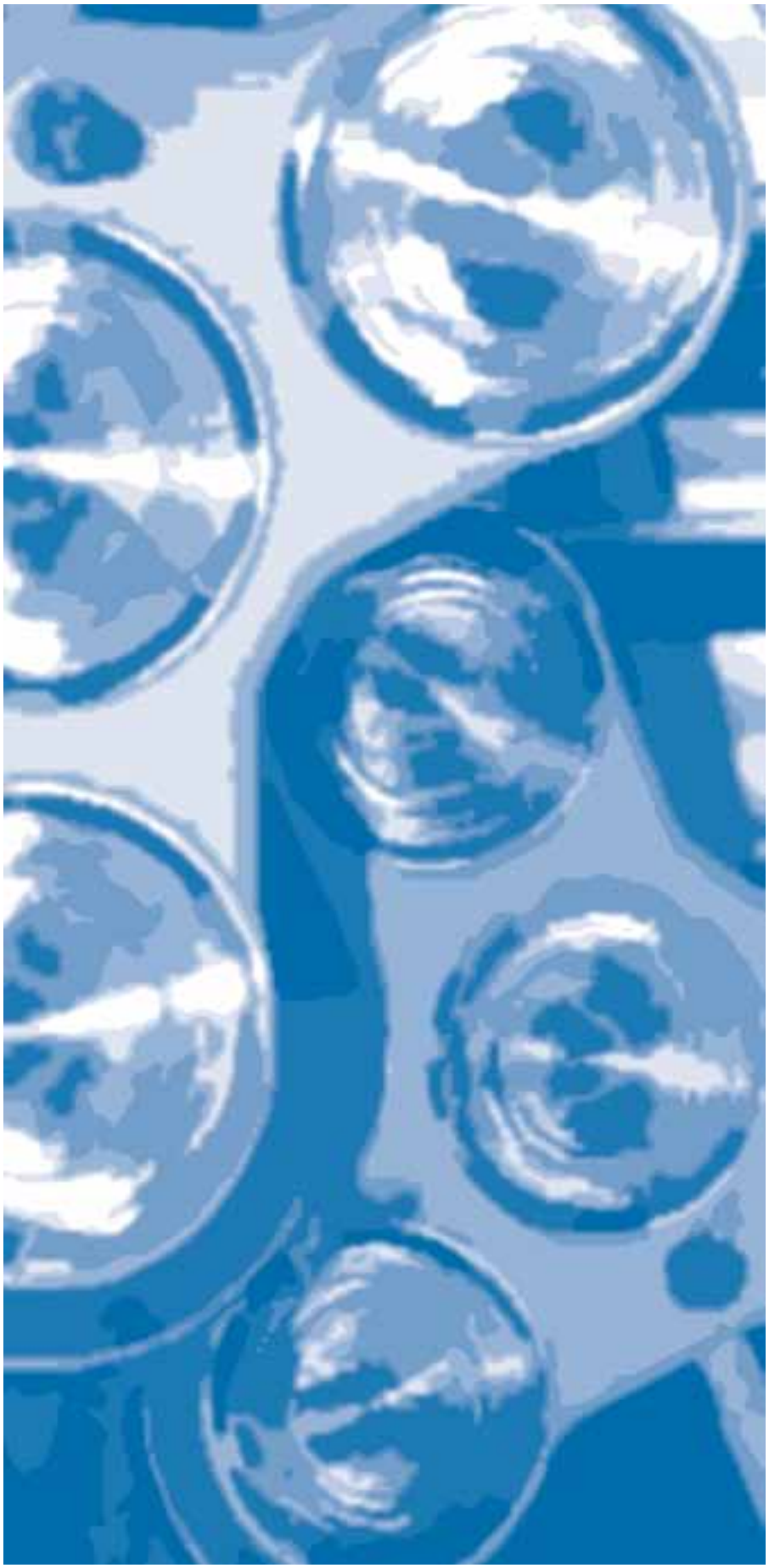
XM420 mounting frame for enclosures to be installed into panels

For mounting XM420 enclosures into panels. Suitable for all devices of the XM420 series, such as RCM420, RCMA420.



2.5.5

Chapter 2.6



A-ISOMETER® IR420-D6

Offline monitor for de-energized AC, DC and 3(N)AC loads in TN,TT and IT systems

A-ISOMETER® IR420-D6

Device features

- Insulation monitoring for de-energized TN,TT and unearthed systems AC, 3(N)AC and DC
- Nominal voltage extendable via coupling device
- Two separately adjustable response values100 kΩ…10 MΩ
- LEDs: Power On LED, alarm LEDs for insulation faults Alarm 1, Alarm 2
- Combined test/reset button
- Two separate alarm relays with one changeover contact each
- Fault memory behaviour, selectable

Approvals

c UL us LISTED

AE25

Under development!

Product description

The offline monitor of the IR420-D6 series is designed to monitor the insulation resistance of loads in the de-energized state. These loads, usually temporarily operated or de-energized most of the time, e.g. fire extinguisher pumps, slide valve drives etc. are supplied from TN, TT or IT systems. During the shut-down periods, hohwever, humidity or other effects may cause insulation faults in the wiring or the loads which may go undetected. Switching the device on may then lead to the tripping of the protective device or may even result in motor fires and the device cannot be operated. In combination with a coupling device, the Isometers can also be used for higher voltages.

Application

- De-energized loads such as automatic fire extinguisher pumps, emergency drives, ship cranes, slide-valve drives in supply lines (gas, water, oil), motor-driven closing systems, diving pumps, drives for anchors, elevators, flue-gas valves and stand-by generators.

Function

When the insulation resistance between the system conductors and earth falls below the set response values, the alarm relays switch and the alarm LEDs light up. The measured value is indicated on the internal LC display. In this way any changes, for example when circuits are connected to the system, can be recognized easily. The fault memory can be reset by pressing the reset button. The device function can be tested using the test button. Two separately adjustable response values with one alarm relay each allow prewarning already in case of very high-resistance insulation faults. When the lower response level is reached, an interlocking function will be activated and the connection of a defective load can be prevented.

The insulation resistance is measured via the output L1 or via a contact to the system being monitored. The contact is controlled via the external contact element K3. With the contact in closed position, the system is de-energized and the insulation resistance is being measured. If the system or load is in operation, K3 opens the contact and insulation monitoring is deactivated. Make sure that the main switch disconnects all poles. To ensure that the measuring voltage can be superimposed onto the system, a low-resistance connection must exist between all line conductors (e.g. by motor windings).

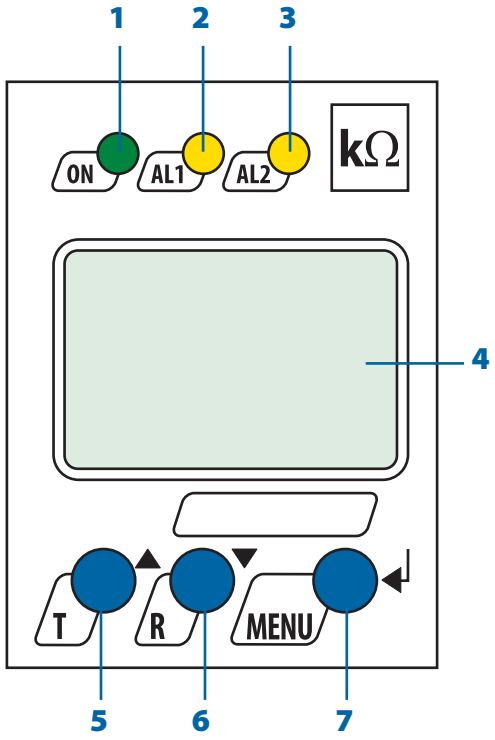
Note: If the IR420-D6 is operated via a coupling device, the auxiliary contact (N/C contact) of K3 between the A-ISOMETER® and the coupling device need not to be designed for the nominal voltage of the system. A rated contact voltage of AC 230 V will be sufficient here.

Measuring principle

DC

Superimposed DC voltage with inverter.

Operating elements



1 - Operation indicator “ON”, flashes in case of interruption of the connecting leads earth/ KE

2 - Alarm LED “AL1”, lights when the value falls below the set response value Alarm 1 and flashes in case of interruption of the connecting leads earth/KE

3 - Alarm LED “AL2”, lights when the value falls below the set response value Alarm 2 and flashes in case of interruption of the connecting leads earth/KE

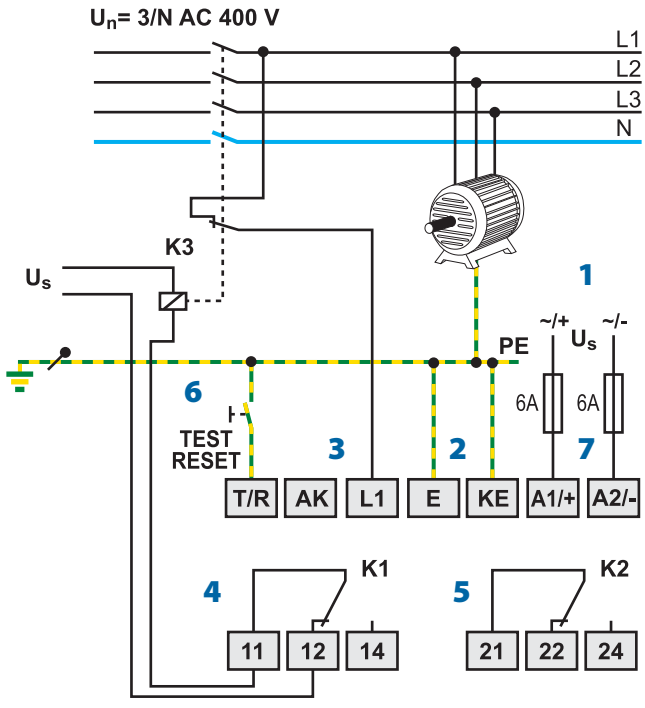
4 - LC display

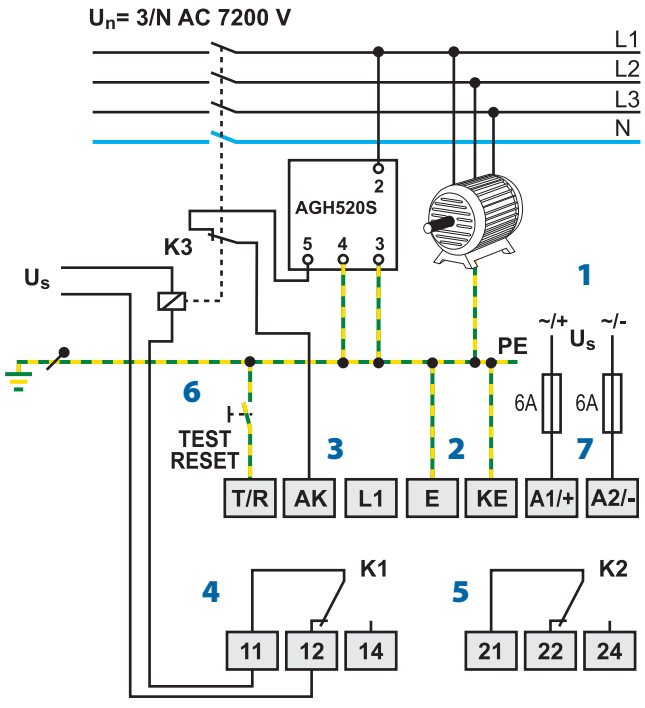
5 - Test button “T”: to call up the self test.
Arrow-up key: Parameter change, to move up in the menu.

6 - Reset button “R”: to delete stored insulation fault alarms
Arrow-down key: Parameter change, to move down in the menu.

7 - MENU key: To call up the menu system
Enter key: to confirm parameter change.

Wiring diagrams (examples)





1 - Supply voltage U_S (see ordering information) via fuse

2 - Separate connection of E, KE to PE

3 - Connection to the AC system being monitored:

4 - Alarm relay K1: Alarm 1

5 - Alarm relay K2: Alarm 2

6 - Combined test and reset button “T/R”
short-time pressing (< 1.5 s) = RESET
long-time pressing (> 1.5 s) = TEST

7 - Line protection by a fuse in accordance with IEC 60364-4-43 (6 A fuse recommended). In case of supply (A1/A2) from an IT system, both lines have to be protected by a fuse.

2.6

Technical data A-ISOMETER® IR420-D6

Insulation coordination acc. to IEC 60664-1/IEC 60664-3

Rated insulation voltage	400 V
Rated impulse voltage/pollution degree	4 kV / III
Protective separation (reinforced insulation) between	(A1, A2) – (L1, AK, E, KE, T/R) – (11, 12, 14) - (21, 22, 24)
Voltage test according to IEC 61010-1	2.21 kV

Supply voltage

Supply voltage U_S	see ordering information
Power consumption	≤ 3 VA

IT system being monitored

Nominal system voltage U_n	offline
without AGH	Nominal contact voltage of the N/C contact of K3 (switch-on contactor)
with AGH520S	AC 50…400 Hz, 0…7200 V

Response values

Response value R_{an1} (Alarm 1)	100 kΩ…10 MΩ (1 MΩ)*
Response value R_{an2} (Alarm 2)	100 kΩ…10 MΩ (100 kΩ)*
Relative percentage error	± 15 %
Hysteresis	+ 25 %

Specified time

Response time t_{an} at R_F = 0.5 x R_{an} and C_e = 1 µF	≤ 4 s
Start-up delay t	0…10 s (0 s)*
Response delay ton	0…99 s (0 s)*

Measuring circuit

Measuring voltage U_m	± 12 V
Measuring current I_m (at R_F = 0 Ω)	≤ 10 µA
Internal DC resistance R_i	≥ 1.2 MΩ
Impedance Z_i at 50 Hz	≥ 1,1 MΩ
Permissible extraneous DC voltage U_{fg}	≤ DC 300 V
Permissible system leakage capacitance C_e	≤ 10 µF

Displays, memory

Display range, measuring value	10 kΩ…20 MΩ
Relative percentage error	± 15 %
Password	off / 0…999 (off)*
Fault memory alarm relay	on/off (off)*

Outputs

Cable length test and reset button	≤ 10 m

Switching elements

Number of switching elements	2 x 1 changeover contact				
Operating principle	N/C or N/O operation (N/O operation)*				
Electrical service life, number of cycles	10.000				
Contact data acc. to IEC 60947-5-1					
Utilization category	AC-13	AC-14	DC-12	DC-12	DC-12
Rated operational voltage	230 V	230 V	220 V	110 V	24 V
Rated operational current	5 A	3 A	0.1 A	0.2 A	1 A
Minimum contact load	1 mA at AC/DC ≥ 10 V				

Environmental conditions / EMC

EMC	IEC 61326
Operating temperature	- 25 °C…+ 55 °C
Climatic class acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3K5 (except condensation and formation of ice)
Transport (IEC 60721-3-2)	2K3 (except condensation and formation of ice)
Long-time storage (IEC 60721-3-1)	1K4 (except condensation and formation of ice)
Classification of mechanical conditions IEC 60721	
Stationary use (IEC 60721-3-3)	3M4
Transport (IEC 60721-3-2)	2M2
Long-time storage (IEC 60721-3-1)	1M3

Connection

Connection	screw-type terminals
rigid/flexible/conductor sizes	0.2…4/0.2…2.5 mm²/24-12 AWG
Multi-conductor connection (2 conductors with the same cross section) rigid/flexible	0.2…1.5/0.2…1.5 mm²
Stripping length	8 mm
Tightening torque	0.5…0.6 Nm

General data

Operating mode	continuous operation
Mounting	any position
Degree of protection, internal components (IEC 60529)	IP 30
Degree of protection, terminals (IEC 60529)	IP 20
Enclosure material	polycarbonate
DIN rail mounting acc. to	IEC 60715
Screw mounting	2 x M4 with mounting clip
Product standards	DIN EN 61557-8 EN 61557-8, IEC 61557-8, ASTM F1134-94
Operating manual	BP101014
Weight	≤ 150 g

( )* = factory setting

2.6

Ordering information

Type	Supply voltage* U_S	Response value R_{an}	System leakage capacitance C_e	Art. No.
IR420-D6-1	DC 9.6…94 V/AC 42…460 Hz 16…72 V	100 kΩ…10 MΩ	≤ 10 µF	B 9101 6415
IR420-D6-2	DC 70…300 V/AC 42…460 Hz 70…300 V	100 kΩ…10 MΩ	≤ 10 µF	B 9101 6407

Device version with “screw-type terminals” on request.
* absolute values

Accessories

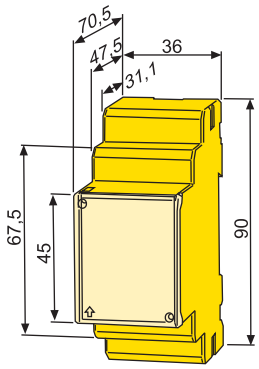
Type	Nominal system voltage* U_n	Art. No.
AGH520S	AC 50…400 Hz 0…7200 V	B 913 033

Type	Art. No.
Mounting clip for screw mounting (one piece per device)	B 9806 0008

Dimension diagram XM420

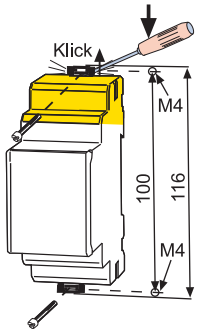
Dimensions in mm

Open the front plate cover in direction of arrow!



Screw fixing

Note: The upper mounting clip must be ordered separately (see ordering information).



A-ISOMETER® IR426-D47

Insulation monitoring device for unearthed AC/DC systems (IT systems for the supply of operating theatre luminaires)

A-ISOMETER® IR426-D47

Device features

- Insulation monitoring for AC/DC systems supplying operating theatre luminaires
- Two separately adjustable response values
- Connection monitoring system/earth
- LEDs: Power On, Alarm 1, Alarm 2
- Internal/external test/reset button
- Two separate alarm relays (one changeover contact each)
- N/O or N/C operation, selectable
- Fault memory behaviour, selectable
- Self monitoring with automatic alarm message
- Multi-functional LC display
- Adjustable response delay
- Two-module enclosure (36 mm)

Product description

The A-ISOMETER® IR426-D47 monitors the insulation resistance of unearthed AC/DC systems for the supply of operating theatre luminaires. DC-supplied components in AC/DC systems do not influence the operating characteristics. An external supply voltage allows de-energized systems to be monitored too.

Application

- AC/DC systems for the supply of operating theatre luminaires in medical locations according to IEC 60364-7-710 and DIN VDE 0100-710.

Function

The currently measured insulation resistance is indicated on the LC display. When the value falls below the preset response values, the response delay "t_{on}"starts. Once the response delay "t_{on}" has elapsed, the "K1/K2" alarm relays switch and the alarm LEDs "AL1/AL2" light up. Two separately adjustable response values/alarm relays allow a distinction to be made between prewarning and alarm. If the insulation resistance exceeds the release value (response value plus hysteresis), the alarm relays return to their initial position. Insulation faults are distinguished according to AC and DC faults (indication ±). If the fault memory is enabled, the alarm relays remain in the alarm state until the reset button is pressed or until the supply voltage is switched off. The device function can be tested using the test button. The parameterization of the device can be carried out via the LC display or the function keys integrated in the front plate.

The alarm messages of the IR426-D47 are transferred to the BMS bus via the alarm contact 11/14 resp. the input IN/T1 of the A-ISOMETER® 107TD47. That allows an alarm messages to be displayed at the MK2430 resp. at the TM operator panel in plain text format.

Connection monitoring

The connections to the system (L1 / L2) and earth (E / KE) are either automatically checked every 24 h, or by pressing the test button or when supply voltage is applied. In case of interruption of a connecting lead, the alarm relays K1 / K2 switch, the LEDs ON // AL1 // AL2 flash and the following message appears on the display:

"E.02" indicating a fault in the connecting leads to the system,

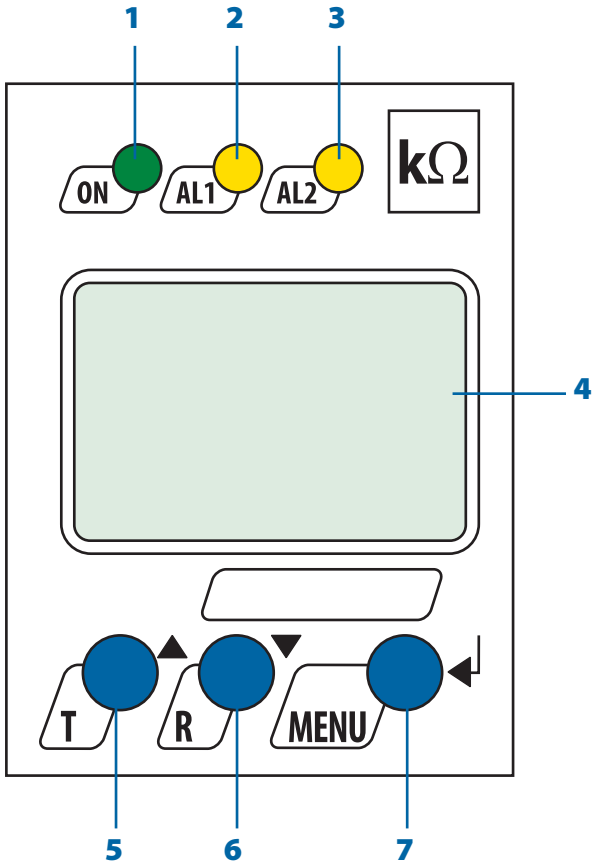
"E.01" indicating a fault in the connecting leads to PE.

After eliminating the fault, the alarm relays return to their initial position either automatically or by pressing the reset button.

Measuring principle

The A-ISOMETER® IR426 uses the AMP measuring principle.

Operating elements



1 - Operation indicator “ON”, flashes in case of interruption of the connecting leads E/KE or L1 / L2.

2 - Alarm LED “AL1”, lights when the value falls below the set response value Alarm 1 and flashes in case of interruption of the connecting leads E/KE or L1/L2).

3 - Alarm LED “AL2”, lights when the value falls below the set response value Alarm 2 and flashes in case of interruption of the connecting leads E/KE or L1/L2.

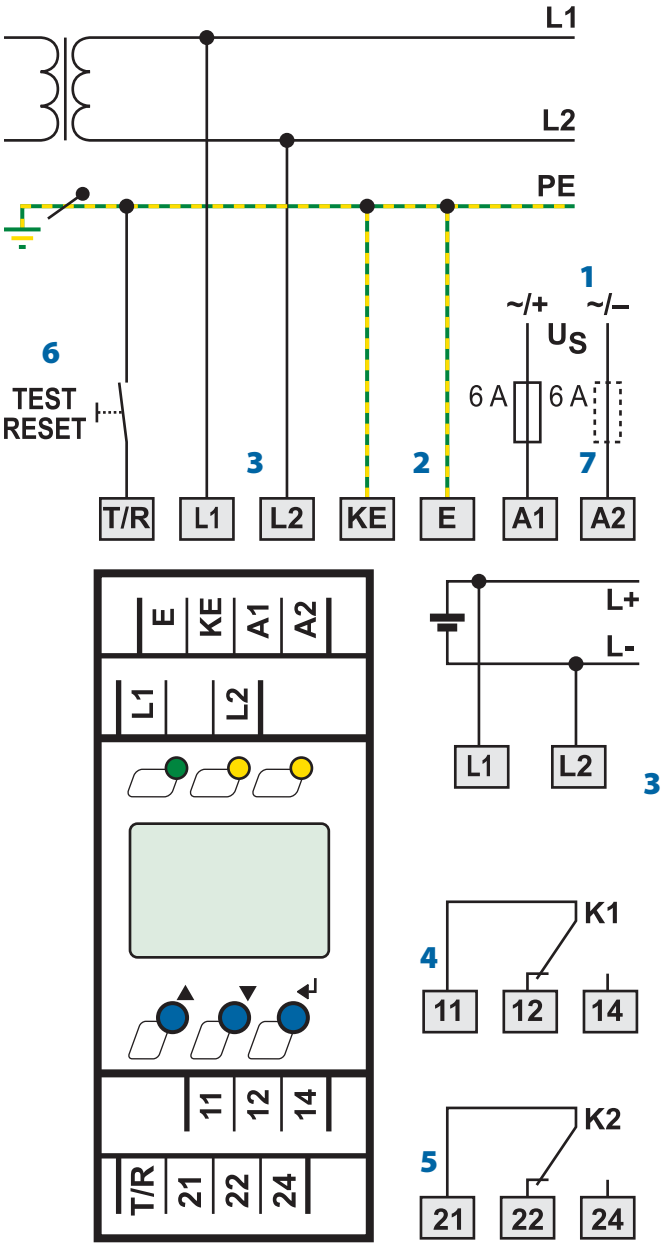
4 - LC display

5 - Test button “T”: to call up the self test
Arrow-up key: Parameter change, to move up in the menu.

6 - Reset button “R”: to delete stored insulation fault alarms
Arrow-down key: Parameter change, to move down in the menu.

7 - MENU key: to call up the menu system
Enter key: to confirm parameter change.

Wiring diagram



1 - Supply voltage U_S (see ordering information) via fuse

2 - Separate connection of E, KE to PE

3 - Connection to the IT system being monitored:
AC: Connect terminals L1, L2 to conductor L1, L2.
DC: Connect terminal L1 to L+ and L2 to L-.

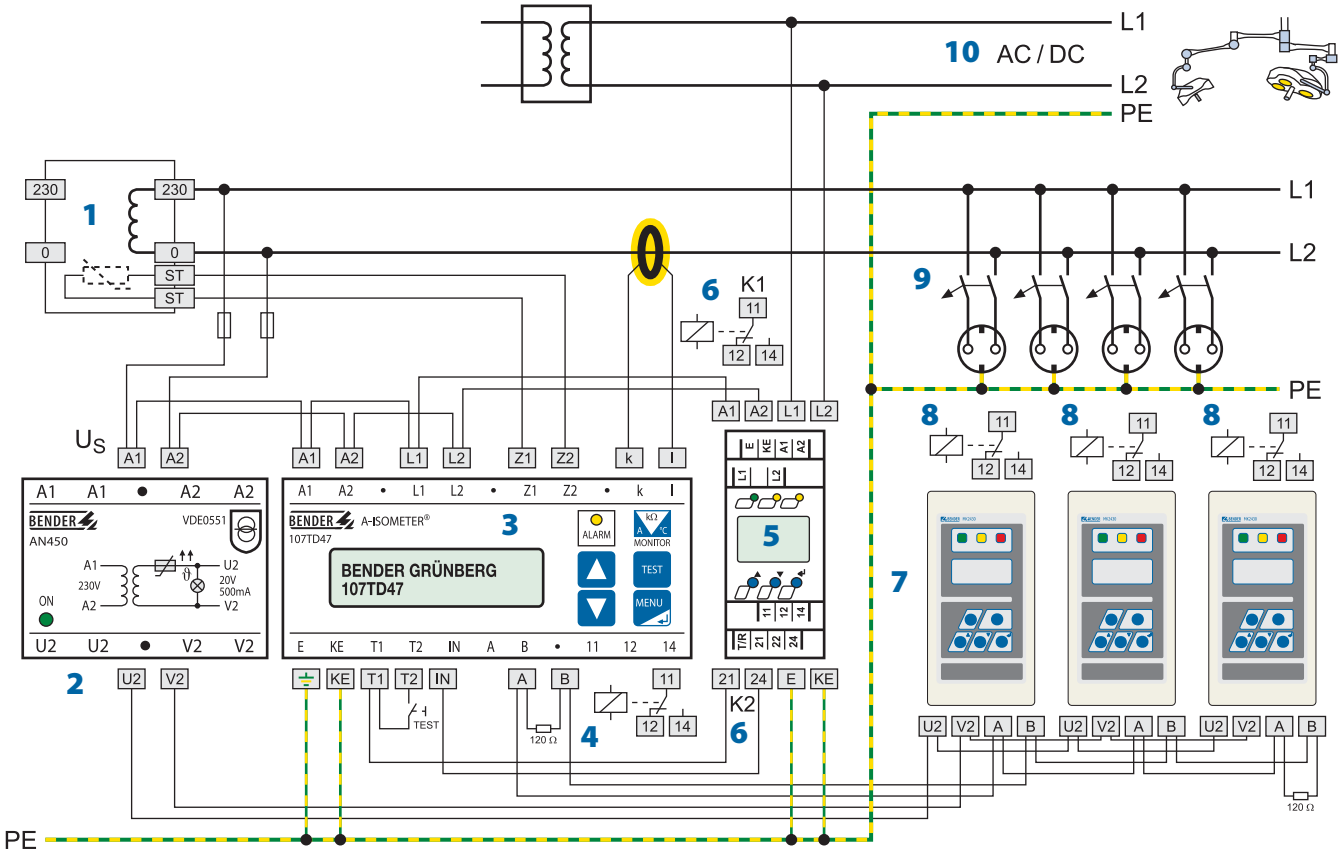
4 - Alarm relay K1: Alarm 1

5 - Alarm relay K2: Alarm 2

6 - Combined external test and reset button
short-time pressing (< 1.5 s) = RESET
long-time pressing (> 1.5 s) = TEST

7 - Line protection by a fuse in accordance with IEC 60364-4-43 (6 A fuse recommended). In case of supply (A1/A2) from an IT system, both lines have to be protected by a fuse.

Example of a monitoring system for IT systems and operating theatre luminaires circuits in medical locations according to IEC 60364-7-710 and DIN VDE 0100-710



1 - IT system transformer
2 - Power supply unit AN450 for max. 3 MK2430
3 - A-ISOMETER® 107TD47
4 - Alarm relay 107TD47
5 - A-ISOMETER® IR426-D47
6 - Alarm relay K1 IR426-D47
Alarm relay K2 IR426-D47
7 - Remote alarm indicator and test combination MK2430
8 - Alarm relay MK2430-11
9 - IT system operating theatre
10 - IT system operating theatre luminaire

2.6

Technical data A-ISOMETER® IR426-D47

Insulation coordination acc. to IEC 60664-1/IEC 60664-3

Rated insulation voltage	250 V
Rated impulse voltage/pollution degree	2.5 kV / III
Protective separation (reinforced insulation) between (A1, A2) - (L1, L2, E, KE, T/R) - (11, 12, 14) - (21, 22, 24)	
Voltage test according to IEC 61010-1	2.21 kV

Supply voltage

Supply voltage U_S	see ordering information
Power consumption	≤ 3 VA

IT system being monitored

Nominal system voltage U_n	AC/DC 0…132 V
Rated frequency f_n	DC, 42…62 Hz

Response values

Response value R_{an1} (Alarm 1)	10…200 kΩ (50 kΩ)*
Response value R_{an2} (Alarm 2)	10…200 kΩ (50 kΩ)*
Relative percentage error	± 15 %
Hysteresis	25 %

Specified time

Response time t_{an} at $R_F = 0.5 \times R_{an}$ and $C_e = 1$ µF	≤ 3 s
Start-up delay t	0…10 s (0 s)*
Response delay t_{on}	0…99 s (0 s)*

Measuring circuit

Measuring voltage U_m	± 12 V
Measuring current I_m (at $R_F = 0$ Ω)	≤ 100 µA
Internal DC resistance R_i	≥ 120 kΩ
Impedance Z_i at 50 Hz	≥ 117 kΩ
Permissible extraneous DC voltage	≤ DC 132 V
Permissible system leakage capacitance	≤ 20 µF

Displays, memory

Display range, measuring value	1 kΩ…1 MΩ
Operating error 1 kΩ…5 kΩ/5 kΩ…1 MΩ	± 1 kΩ/± 15 %
Password	off/0…999 (off, 1)*
Fault memory, alarm relay	on/off*

Outputs

Cable length test and reset button	≤ 10 m

Switching elements

Number of switching elements	2 x 1 changeover contact				
Operating principle	N/C operation/N/O operation (N/C operation)*				
Electrical service life, number of cycles	10.000				
Contact data acc. to IEC 60947-5-1					
Utilization category	AC-13	AC-14	DC-12	DC-12	DC-12
Rated operational voltage	230 V	230 V	220 V	110 V	24 V
Rated operational current	5 A	3 A	0.1 A	0.2 A	1 A
Minimum contact load	1 mA at AC/DC ≥ 10 V				

Environmental conditions / EMC

EMC	IEC 61326
Operating temperature	- 25 °C…+ 55 °C
Climatic class acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3K5 (except condensation and formation of ice)
Transport (IEC 60721-3-2)	2K3 (except condensation and formation of ice)
Long-time storage (IEC 60721-3-1)	1K4 (except condensation and formation of ice)
Classification of mechanical conditions acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3M4
Transport (IEC 60721-3-2)	2M2
Long-time storage (IEC 60721-3-1)	1M3

Connection

Connection	screw-type terminals
rigid/flexible/conductor sizes	0.2…4/0.2…2.5 mm²/24-12 AWG
Multi-conductor connection (2 conductors with the same cross section) rigid/flexible	0.2…1.5/0.2…1.5 mm²
Stripping length	8 mm
Tightening torque	0.5…0.6 Nm

Other

Operating mode	continuous operation
Mounting	any position
Degree of protection, internal components (IEC 60529)	IP 30
Degree of protection, terminals (IEC 60529)	IP 20
Enclosure material	polycarbonate
DIN rail mounting acc. to	IEC 60715
Screw mounting	2 x M4 with mounting clip
Product standards	DIN EN 61557-8, EN 61557-8 IEC 61557-8, ASTM F 1669M-96
Operating manual	BP101016
Weight	≤ 150 g

( )* = factory setting

2.6

Ordering information

Type	Nominal system voltage* U_n	Supply voltage* U_S	Response value R_{an}	System leakage capacitance C_e	Art. No.
IR426-D47	DC/AC 42…62 Hz 0…132 V	DC 70…300 V/AC 15…460 Hz 70…300 V	10…200 kΩ	≤ 20 µF	B 9101 6307

Device version with “screw-type terminals” on request.
* absolute values

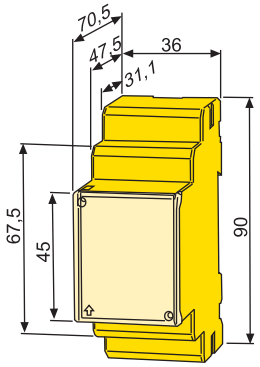
Accessories

Type	Art. No.
Mounting clip for screw mounting (one piece per device)	B 9806 0008

Dimension diagram XM420

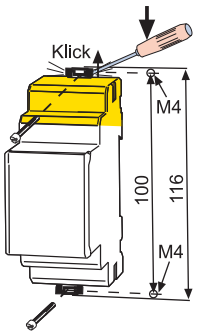
Dimensions in mm

Open the front plate cover in direction of arrow!

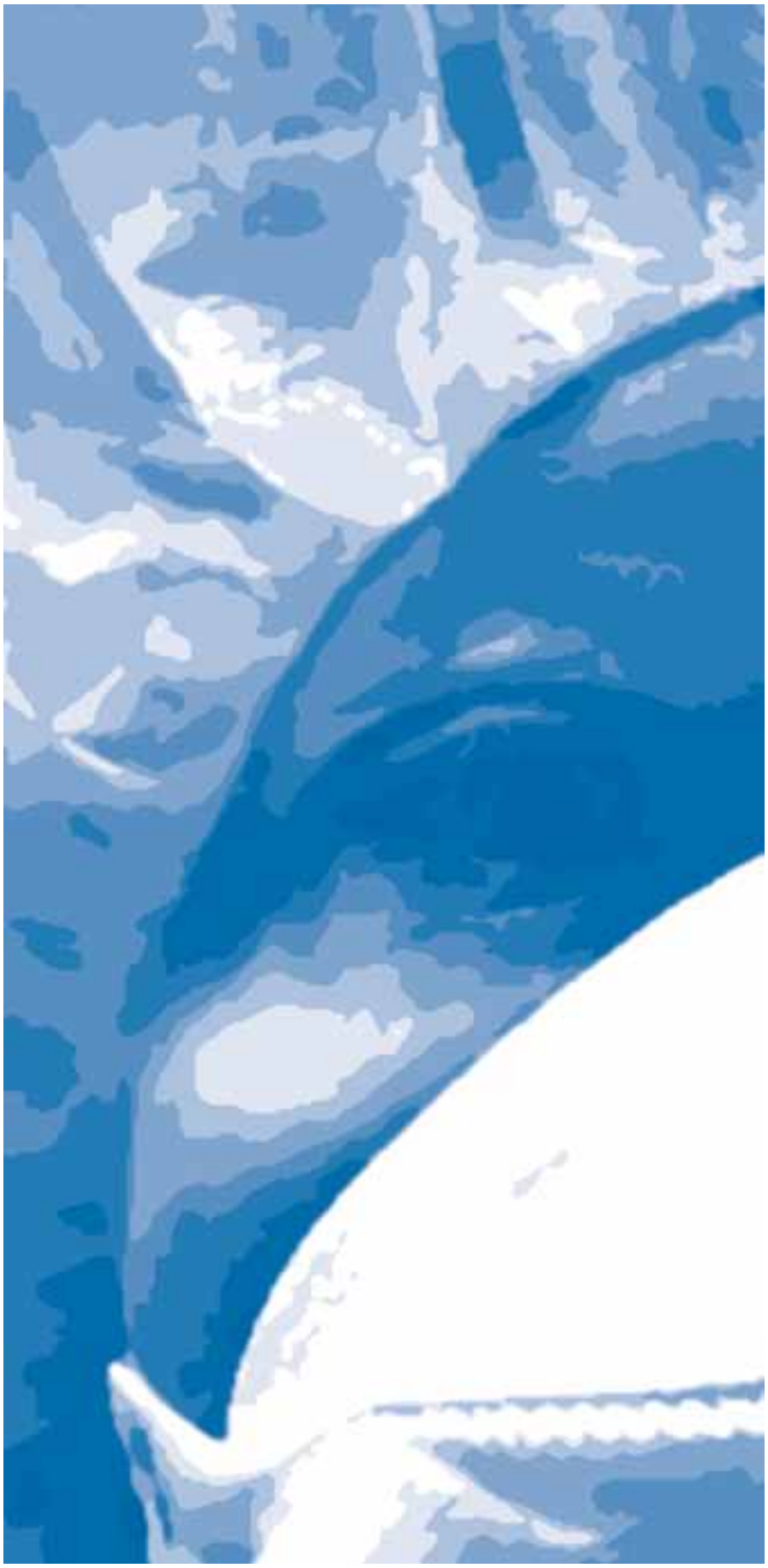


Screw fixing

Note: The upper mounting clip must be ordered separately (see ordering information).



Floor-mounted and wall-mounted distribution cabinets for IT systems



IT system distribution cabinet TR-VITCF

IT system distribution cabinet for intensive care units with maximum four beds

IT system distribution cabinet TR-VITCF

Device features

- Internal components
  - Isolating transformer (6300 or 8000 VA)
  - Changeover module with voltage monitoring
  - IT system monitoring (insulation, load, transformer temperature)
  - Insulation fault location system for 12 circuits
  - Two-pole circuit breakers B16A per circuit
- Customers can save time and money as the distribution cabinets are supplied prewired
- Covering of sheet-steel according to DIN VDE 0100-710: 2002-11 para. 710.51.2.2
- Designed in accordance with the requirements of applicable standards
- Voluntary test of the changeover module by TÜV (German Technical Inspection Authority)
- Connection for alarm indicator and test combinations MK800/MK2430
- Connection for alarm indicator and operator panels of the TM series
- Variable changeover period t ≤ 0.5…20 s
- Screwless-type terminals
- Short delivery time

Application

The IT system distribution cabinets of the TR-VITCF series supply electrical power to group 2 medical locations, e.g. intensive care units. For

- socket-outlet circuits for medical electrical equipment and
- operating theatre luminaires circuits and similar lighting

supplied with nominal voltages exceeding AC 25 V or DC 60 V, the protective measure "Protection by insulation monitoring with indication in the IT system" is mandatory. Furthermore, a changeover module is required to change over automatically from the safety power supply source to a second supply source in case of failure. Since intensive care units are equipped with a number of socket-outlets, an insulation fault location system is integrated in the TR-VITCF.

Function

The distribution cabinets of the TR-VITCF series contain an isolating transformer and a changeover and monitoring module of the UFC107E-65 resp. -80 series including all necessary monitoring equipment for IT systems in accordance with IEC 60364-7-710:

- Changeover modules with control function
- Insulation monitoring
- Load and temperature monitoring

Furthermore, the distribution cabinet includes an insulation fault location system for 12 outgoing circuits. On the secondary side of the isolating transformer 12 two-pole circuit-breakers are installed. The socket outlets of the group 2 room are connected to these circuit-breakers. For the purpose of heat dissipation, the transformer features conductive plates at the top and ventilation filters in the distribution cabinet door and/or in the distribution cabinet.

Functions in accordance with IEC 60364-7-710 / DIN VDE 0100-710

- Voltage monitoring with control function
  - on the preferred line (Line 1)
  - on the second line (Line 2)
  - at the output of the changeover module (Line 3)
- Variable changeover time t ≤ 0.5…20 s to change over from AV (normal power supply source) to SV (safety power supply source) resp. from SV to UPS (uninterruptible power supply source).
- Protection against wrong operation by multiple interlocking
- Cables are laid to resist shortcircuits and earth faults
- Control circuit with single fault tolerance according to DIN VDE 0100-710:
- Automatic return on voltage recovery
- Functional testing including checking of the operating times
- Insulation, load current and temperature monitoring for the IT system
- Monitoring of the system/PE connections of the insulation monitoring device
- Isolating transformer 6300 or 8000 VA the IT system

Further measures to increase the electrical safety

- Continuous monitoring of the actuation devices and automatic processes (coil, control contacts, connections).
- Monitoring for short-circuits upstream and at the output of the changeover device with pre-defined switching behaviour.

Note

Intensive care units with eight beds require two of these distribution cabinets.

Changeover and monitoring module

In fault-free condition, the preferred supply line is switched on. If the voltage falls below the set value, a changeover to the second supply line will automatically take place. The changeover period can be set individually. In order to ensure operational readiness, the second line as well as the output of the changeover module (Line 3) are monitored too. On voltage recovery, return to the preferred supply line occurs automatically. Owing to variable delay times (return transfer times or delay times), the changeover module meets the individual installation-specific requirements (e.g. coordination of several changeover modules, reduction of switching energy).

Insulation, load and temperature monitoring

The insulation monitoring device continuously monitors the insulation resistance, load current and the temperature of the IT system transformer. If one or several response values are undershot (insulation resistance) or overshot (load current, temperature), the alarm relay switches and a corresponding message occurs. The connections to the system and PE, as well as to the measuring current transformer and temperature sensor, are permanently monitored. In the event of wire breakage or short circuit, a message will appear. The patented AMP measuring technique is used in order to exclude the possibility of insulation monitoring being impaired by DC components.

Insulation fault location system (EDS system)

In Group 2 medical locations featuring a large number of socket outlet circuits and/or loads (e.g. intensive care units), locating faulty circuits or loads can often be a time-consuming and difficult task for medical and technical personnel. The EDS insulation fault location system solves this problem by automatically locating the insulation fault during operation.

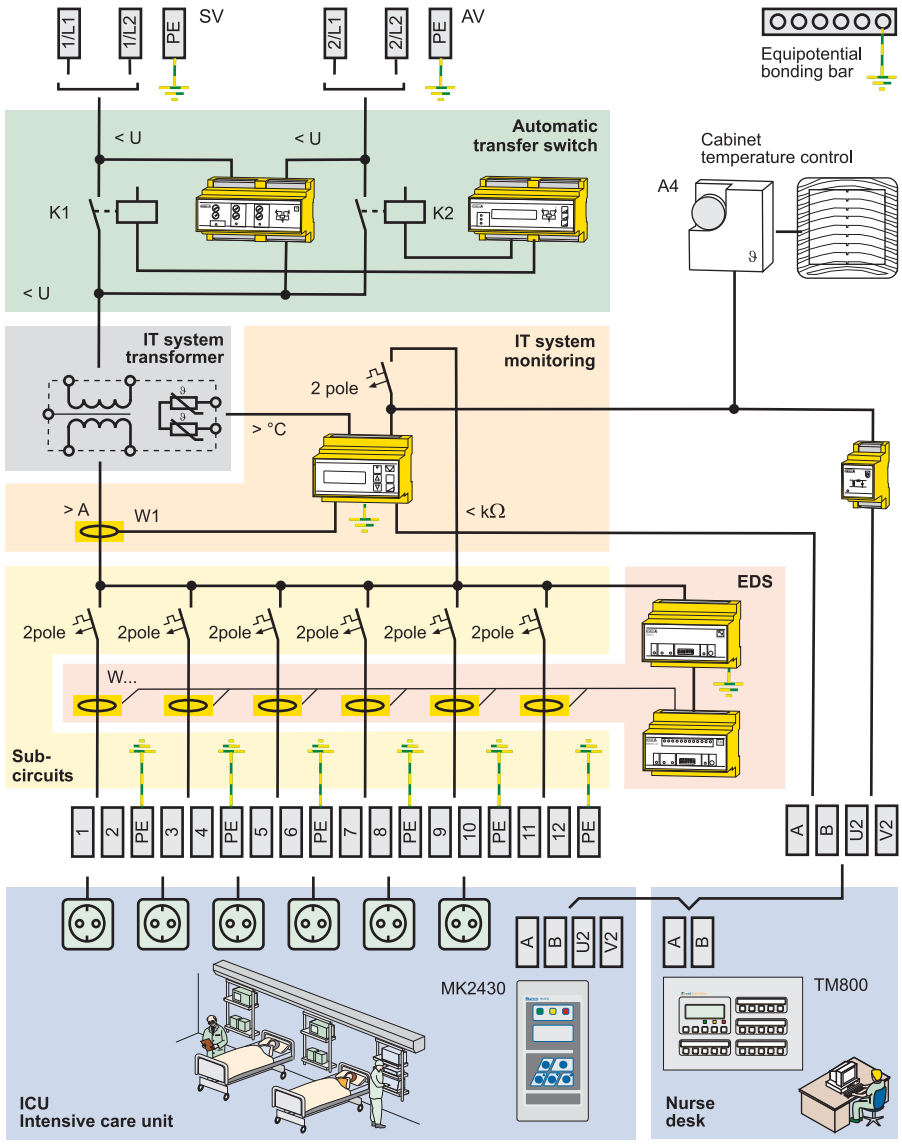
This results in two decisive advantages: fault location and availability are optimised in terms of both time and cost, because the system remains in operation during automatic fault location.

Function of the EDS system

The insulation fault location process starts when the A-ISOMETER® 107TD47 reports an insulation fault. The PGH474 test device generates a test current of max. 1 mA. This test current flows via the insulation fault location and via the earth wire (PE wire) back to the test device. The test current is detected by a measuring current transformer located on the fault path and reported by the EDS474 evaluator via the bus. The faulty circuit or load is identified by means of an assignment between the measuring current transformer/subcircuit and a unique text message, e.g. on a TM alarm indicator and operator panel, on the MK800 or the MK2430 alarm indicator and test combination.

Messages displayed in plain text

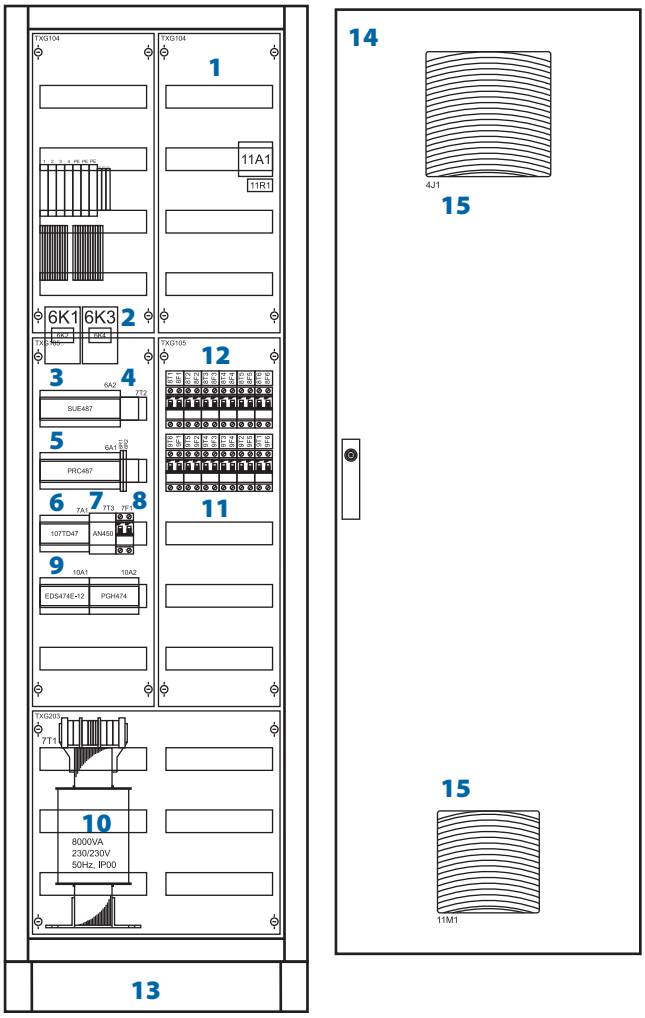
The unique status, warning and fault messages are displayed in plain text. The required MK2430, MK800 alarm indicator and test combinations or TM alarm indicator and operator panel need to be installed at a suitable place in the medical location, so that it can be permanently monitored by the medical staff. A two-wire bus cable is required to connect the TR-VITC distribution cabinet to the alarm indicator panels.



Overview wiring diagram

2.7

Design



1 - Terminal area
2 - Switching elements changeover module
3 - Voltage monitoring device SUE487
4 - Current transformer load monitoring
5 - Control devices PRC487
6 - Insulation, load and temperature monitoring device 107TD47
7 - Power supply unit for MK2430/MK800 alarm indicator and operator panels
8 - Circuit breakers for the power supply of the devices
9 - Insulation fault location system
10 - IT system transformer
11 - 12 outgoing circuits (IT system) with two-pole circuit-breakers
12 - Measuring current transformer insulation fault location system
13 - Plinth (option)
14 - Front door
15 - Filter SK3325 200

Design details TR-VITCF distribution cabinet

Distribution cabinet

Cabinet range	Striebel & John, Triline R
Cabinet type	2/8 R 4
Degree of protection	IP42
Protection class	Class I (earthed)
Ventilation	filters in the distribution cabinet door, on top and bottom
Panel construction	partition between the different types of supply systems
Cable entry	incoming and outgoing cables from above
Doors and walls	sheet steel 1.5…2 mm
Door	right-hinged
Door lock	lock with latch
Paint finish	RAL 7035
Plinth	sheet steel, height 100 mm, RAL 7005

Installation data

Type of assembly	floor-mounted cabinet with door and plinth
Type of installation	free-standing
Dimensions W x H x D	624 mm x 2013 mm x 425 mm

Type of wiring

Terminal area	at the top
Cable duct	none
Protective/neutral conductor	PE terminals, disconnect terminal ≤ 10 mm²
Busbars	none
Conductor colours	acc. to IEC 60446
Conductors	halogen-free

Labelling

Devices	adhesive labels, IEC 61346-2
Distribution cabinet	adhesive labels, black type on a white
System type labelling	according to IEC

System data

Type of distribution system	IT system (TN-S system optional)
Nominal voltage	N/PE/ AC 230 V

For product standards refer to the table “Technical data”

Ordering information

Type	Nominal power	Weight	Power consumption	Art. No.
TR-VITCF-6300	6300 VA	195 kg	340 W	on request
TR-VITCF-8000	8000 VA	205 kg	382 W	on request

Other versions on request

Technical data floor-mounted distribution cabinet TR-VITCF

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 400 V
Rated impulse voltage/pollution degree	4 kV/3

Power unit/ switching elements

Switching elements	latched contactors
Rated operational voltage U_e	AC 230 V
Operating range U_e	0.8…1.15 x U_e
Frequency f_e	50…60 Hz
Rated operational current Ie (acc. to DIN VDE 0100-710)	29 A/42 A
Rated operational current Ie of the module (AC-3)	65 A/80 A
Fuse	80 A/100 A
Utilization category	AC-3
Two-pole circuit breakers	12 x B 16 A
Changeover period, adjustable	≤ 0.5 s…20 s

Voltage monitoring

Response value undervoltage, adjustable	0.7…0.9 x U_e
Response value overvoltage	1.15 x U_e
Response time t_{an}	50…250 ms
Response time t_{off} adjustable (50 ms steps)	0…9950 ms
Return transfer time t_{on} adjustable (1 s steps)	0…249 s
Pause time, adjustable (50 ms steps)	0…9950 ms

isolating transformer

Classification of insulation	t_a 40/B
Insulation	double insulation
Ambient temperature	≤ 40 °C
Nominal power	6300/8000 VA
Rated frequency	50…60 Hz
Rated input voltage	AC 230 V
Rated output voltage	AC 230/115 V
Making current I_E	< 12 x $\hat{I}_n$
Leakage current	≤ 0.5 mA
No-load input current i_0	≤ 3 %
Short-circuit voltage u_k	≤ 3 %
Screening	between primary and secondary winding

Insulation monitoring 107TD47

Response value R_{an} adjustable	50…500 kΩ
Relative percentage error	0…+ 10 %
Hysteresis	≤ 25 %
Response time t_{an} at R_F = 0.5 x R_{an} and C_e = 1 µF	≤ 3 s
Measuring voltage Um	≤ 12 V
Measuring current Im (at RF = 0 Ω)	≤ 50 µA
Internal DC resistance Ri	≥ 240 kΩ
Impedance Zi at 50 Hz	≥ 200 kΩ
Permissible extraneous DC voltage Ufg	≤ DC 375 V
Permissible system leakage capacitance Ce	≤ 1 µF

Load monitoring 107TD47

Response value, adjustable	5…50 A
Hysteresis	≤ 4 %
Temperature influence	≤ 0.15 %/°C

Temperature monitoring 107TD47

Response value	4 kΩ
Release value	1.6 kΩ
PTC resistors acc. to DIN 44081	max. 6 in series

Insulation fault location system

Test current I_T	≤ 1 mA
Test pulse/break	2 s / 4 s

Interface

Interface / protocol	RS-485 / BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	PRC487: 2…90 – 107TD47: 2…90 PGH: 111…119 – EDS: 61…90
Factory-set device address	PRC487: 4 – 107TD47: 3 – PGH: 111 – EDS: 61
Display, characters	LCD, illuminated, 2 x 16 characters

Switching elements (alarm contacts)

Number of changeover contacts	2
Operating principle	N/C operation

Contact data acc. to IEC 60947-5-1

Rated operational voltage U_e	AC 230 V / DC 220 V
Rated operational current I_e	AC 5 A / DC 0.2 A
Utilization category	AC 14/DC 12
Electrical service life, number of cycles	10.000
Minimum contact load	1 mA at AC / DC > 10 V

Terminals

Control section

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/AWG 28-12
Stripping length	8…9 mm

Power supply section

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	6…35 mm²/AWG 8-2
Stripping length	23 mm

Outgoing circuits

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/4 mm²/AWG 28-12
Stripping length	6…7 mm

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Product standards	
Insulation monitoring	IEC 61557-8
Load and temperature monitoring	IEC 60364-7-710; DIN VDE 0100-710; IEC 60364-7-710
Insulation fault location system	IEC 61557-9
Changeover module	IEC 60364-7-710; DIN VDE 0100-710
Distribution cabinet	IEC 60947-6-1; IEC 60439-1
Isolating transformer	IEC 60364-7-710; DIN VDE 0100-710; IEC 61558-1; IEC 61558-2-15
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Long-time storage	1K4
Ambient temperature, operation	- 10 °C…+ 55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M1
Long-time storage	1M3
Operating mode	continuous operation
Mounting position	vertical
Schematic diagram/circuit diagram	Documentation will be created according to project-specific and customer-specific requirements
Weight/power consumption	see ordering information

IT system distribution cabinet TR-VITC

IT system distribution cabinet TR-VITC

Device features

- Internal components
  - Isolating transformer (3150 to 8000 VA)
  - Changeover module with voltage monitoring 65/80 A
  - IT system monitoring
  - Two-pole circuit breakers B16A per circuit for 6 circuits
- Customers can save time and money as the distribution cabinets are supplied prewired
- Covering of sheet-steel according to DIN VDE 0100-710: 2002-11 para. 710.51.2.2
- Designed in accordance with the requirements of applicable standards
- Voluntary test of the changeover module by TÜV (German Technical Inspection Authority)
- Connection for alarm indicator and test combinations MK800/MK2430
- Connection for TM operator panels
- Variable changeover period t ≤ 0.5…20 s
- Screwless-type terminals
- Exchange of information via bus interface
- Short delivery times

Application

The IT system distribution cabinets of the TR-VITC series supply electrical power to group 2 medical locations, e.g. operating theatres. For

- socket-outlet circuits for medical electrical equipment and
- operating theatre luminaires circuits and similar lighting

supplied with nominal voltages exceeding AC 25 V or DC 60 V, the protective measure "Protection by insulation monitoring with indication in the IT system" is mandatory. Furthermore, a changeover module is required to change over automatically from the safety power supply source to a second supply source in case of failure.

Function

The distribution cabinets of the TR-VITC series contain an isolating transformer and a changeover and monitoring module of the UMC107E-65 resp. -80 series including all necessary monitoring equipment for IT systems in accordance with IEC 60364-7-710 / DIN VDE 0100-710

- Changeover modules with control function
- Insulation monitoring
- Load and temperature monitoring

On the secondary side of the isolating transformer, six two-pole circuit breakers are built-in. The socket outlets of the group 2 room are connected to these circuit breakers. For the purpose of heat dissipation, the transformer features conductive plates at the top and ventilation filters in the distribution cabinet door and/or in the distribution cabinet.

Functions in accordance with IEC 60364-7-710 / DIN VDE 0100-710

- Voltage monitoring with control function
  - on the preferred line (Line 1)
  - on the second line (Line 2)
  - at the output of the changeover module (Line 3)
- Variable changeover time t ≤ 0.5…20 s to change over from AV (normal power supply source) to SV (safety power supply source) resp. from SV to UPS (uninterruptible power supply source).
- Protection against wrong operation by multiple interlocking
- Cables are laid to resist short-circuits and earth faults
- Control circuit with single fault tolerance according to DIN VDE 0100-710
- Automatic return on voltage recovery
- Functional testing including checking of the operating times
- Insulation, load current and temperature monitoring for the IT system
- Monitoring of the system/PE connections of the insulation monitoring device
- Isolating transformer 3150 to 8000 VA for IT systems

Further measures to increase the electrical safety

- Continuous monitoring of the actuation devices and automatic processes (coil, control contacts, connections).

Monitoring for short-circuits upstream and at the output of the changeover device and the pre-defined switching behaviour.

Changeover and monitoring module

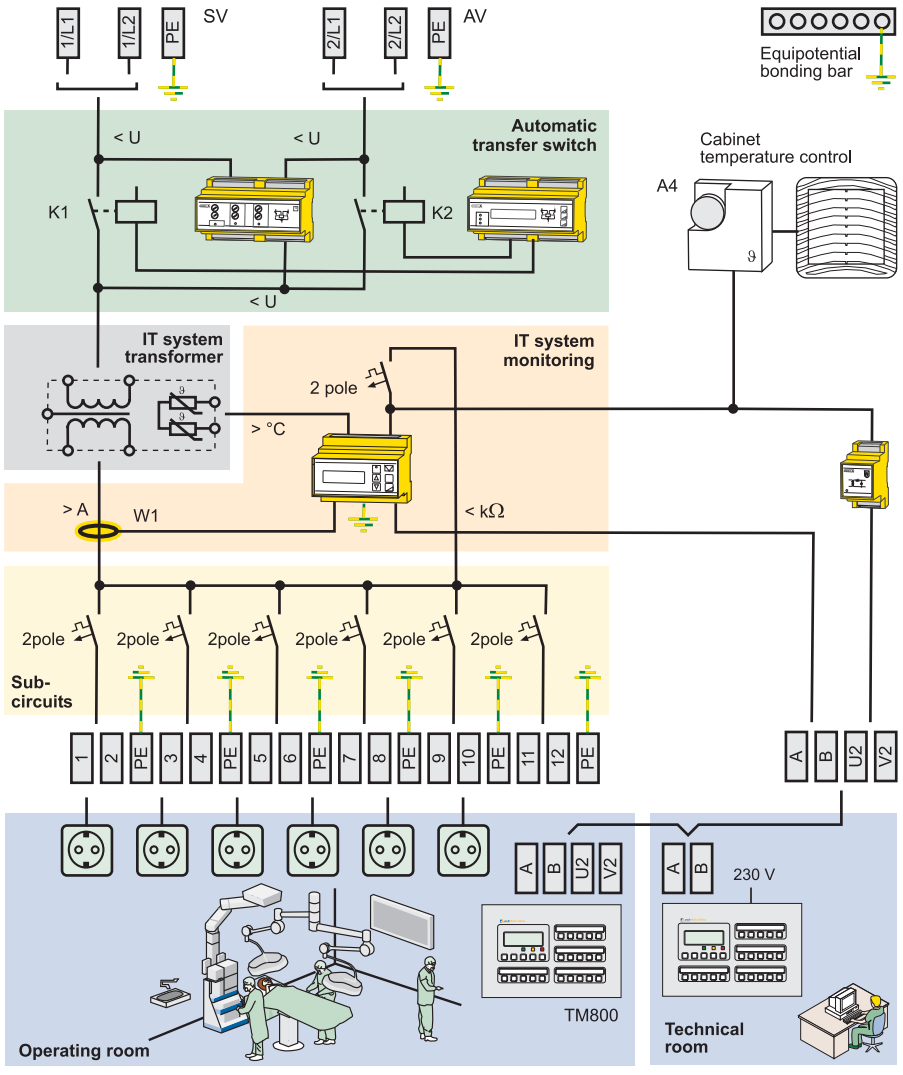
In fault-free condition, the preferred supply line is switched on. If the voltage falls below the set value, a changeover to the second supply line will automatically take place. The changeover period can be set individually. In order to ensure operational readiness, the second line as well as the output of the changeover module (Line 3) are monitored too. On voltage recovery, return to the preferred supply line occurs automatically. Owing to variable delay times (return transfer times or delay times), the changeover module meets the individual installation-specific requirements (e.g. coordination of several changeover modules, reduction of switching energy).

Insulation, load and temperature monitoring

The insulation monitoring device continuously monitors the insulation resistance, load current and the temperature of the IT system transformer. If one or several response values are undershot (insulation resistance) or overshot (load current, temperature), the alarm relay switches and a corresponding message occurs. The connections to the system and PE, as well as to the measuring current transformer and temperature sensor, are permanently monitored. In the event of wire breakage or short-circuit, a message will appear. The patented AMP measuring technique is used in order to exclude the possibility of insulation monitoring being impaired by DC components.

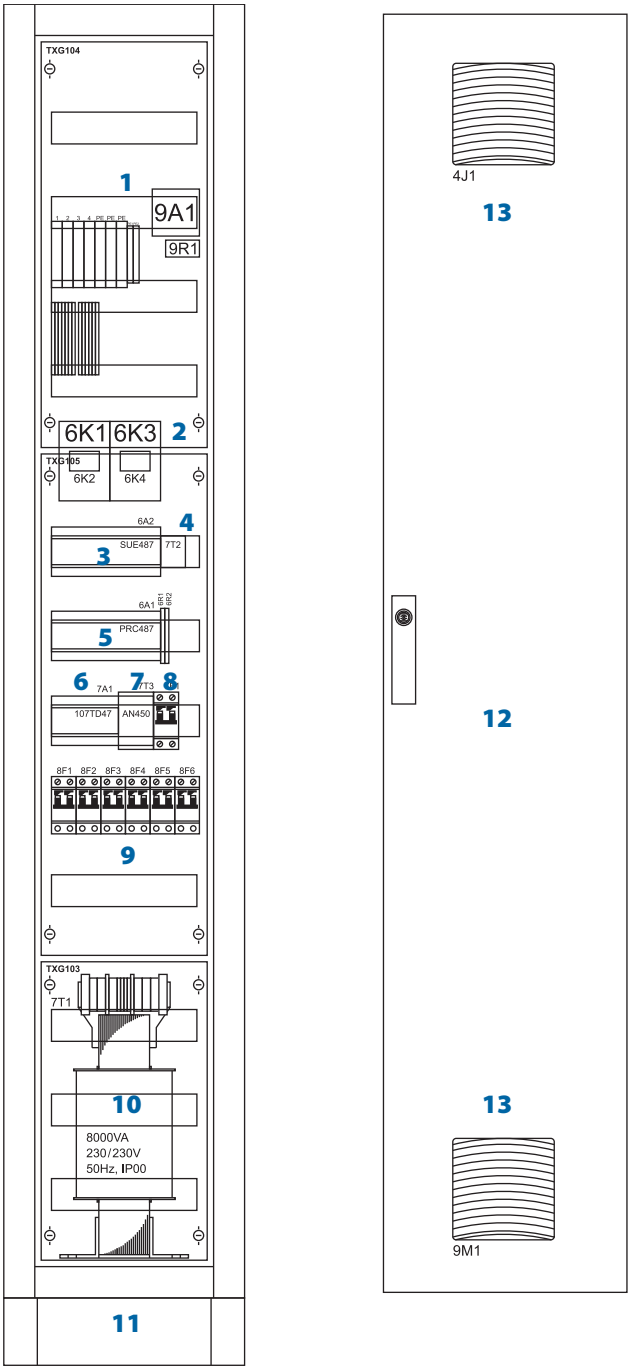
Messages displayed in plain text

The unique status, warning and fault messages are displayed in plain text. The required MK2430, MK800 alarm indicator and test combinations or TM alarm indicator and operator panel need to be installed at a suitable place in the medical location, so that it can be permanently monitored by the medical staff. A two-wire bus cable is required to connect the TR-VITC distribution board to the alarm indicator panels.



Overview wiring diagram

Design



1 - Terminal area
2 - Switching elements changeover module
3 - Voltage monitoring device SUE487
4 - Current transformer load monitoring
5 - Control devices PRC487
6 - Insulation, load and temperature monitoring device 107TD47
7 - Power supply unit for MK2430/MK800 alarm indicator and operator panels
8 - Circuit breakers for the power supply of the devices
9 - 6 outgoing circuits (IT system) with two-pole circuit-breakers
10 - IT system transformer
11 - Plinth (option)
12 - Front door
13 - Filter SK3325 200

Design details TR-VITC distribution board

Distribution cabinet

Cabinet range	Striebel & John, Triline R
Cabinet type	1/8 R 4
Degree of protection	IP42
Protection class	Class I (earthed)
Ventilation	filters in the distribution cabinet door, on top and bottom
Panel construction	partition between the different types of supply systems
Cable entry	incoming and outgoing cables from above
Doors and walls	sheet steel 1.5…2 mm
Door	right-hinged
Door lock	lock with latch
Paint finish	RAL 7035
Plinth	sheet steel, height 100 mm, RAL 7005

Installation data

Type of assembly	floor-mounted cabinet with door and plinth
Type of installation	free-standing
Transporttrennung	keine
Dimensions W x H x D	374 mm x 2013 mm x 425 mm

Type of wiring

Terminal area	at the top
Cable duct	none
Protective/neutral conductor	PE terminals, disconnect terminal ≤ 10 mm²
Busbars	none
Conductor colours	acc. to IEC 60446
Conductors	halogen-free

Labelling

Devices	adhesive labels, IEC 61346-2
Distribution cabinet	adhesive labels, black type on a white
System type labelling	according to IEC

System data

Type of distribution system	IT system (TNS system optional)
Nominal voltage	N/PE/ AC 230 V

For product standards refer to the table “Technical data”

Ordering information

Type	Nominal power	Weight	Power consumption	Art. No.
TR-VITC-3150	3150 VA	130 kg	248 W	on request
TR-VITC-4000	4000 VA	143 kg	234 W	on request
TR-VITC-5000	5000 VA	145 kg	275 W	on request
TR-VITC-6300	6300 VA	150 kg	314 W	on request
TR-VITC-8000	8000 VA	160 kg	350 W	on request

Other versions on request

Technical data floor-mounted distribution board TR-VITC

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 400 V
Rated impulse voltage/pollution degree	4 kV/3

Poweer unit/ switching elements

Switching elements	latched contactors
Rated operational voltage U_e	AC 230 V
Operating range U_e	0.8…1.15 x U_e
Frequency f_e	50…60 Hz
Rated operational current I_e (acc. to DIN VDE 0100-710)	29 A/42 A
Rated operational current I_e of the module (AC-3)	65 A/80 A
Fuse	80 A/100 A
Utilization category	AC-3
Two-pole circuit breakers	6 x B 16 A
Changeover period, adjustable	≤ 0.5 s…20 s

Voltage monitoring

Response value undervoltage, adjustable	0.7…0.9 x U_e
Response value overvoltage	1.15 x U_e
Response time t_{an}	50…250 ms
Response time t_{off} adjustable (50 ms steps)	0…9950 ms
Return transfer time t_{on} adjustable (1 s steps)	0…249 s
Pause time, adjustable (50 ms steps)	0…9950 ms

isolating transformer

Classification of insulation	t_a 40/B
Insulation	double insulation
Ambient temperature	≤ 40 °C
Nominal power	6300/8000 VA
Rated frequency	50…60 Hz
Rated input voltage	AC 230 V
Rated output voltage	AC 230/115 V
Making current I_E	< 12 x $\hat{I}_n$
Leakage current	≤ 0.5 mA
No-load input current i_0	≤ 3 %
Short-circuit voltage u_k	≤ 3 %
Screening	between primary and secondary winding

Insulation monitoring 107TD47

Response value R_{an} adjustable	50…500 kΩ
Relative percentage error	0…+10 %
Hysteresis	≤ 25 %
Response time t_{an} at R_F = 0.5 x R_{an} and C_e = 1µF	≤ 3 s
Measuring voltage U_m	≤ 12 V
Measuring current I_m (at R_F = 0 Ω)	≤ 50 µA
Internal DC resistance R_i	≥ 240 kΩ
Impedance Z_i at 50 Hz	≥ 200 kΩ
Permissible extraneous DC voltage U_{fg}	≤ DC 375 V
Permissible system leakage capacitance C_e	≤ 5 µF

Load monitoring 107TD47

Response value, adjustable	5…50 A
Hysteresis	≤ 4 %
Temperature influence	≤ 0.15 %/°C

Temperature monitoring 107TD47

Response value	4 kΩ
Release value	1.6 kΩ
PTC resistors acc. to DIN 44081	max. 6 in series

Interface

Interface / protocol	RS-485 / BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	PRC487: 2…90 – 107TD47: 2…90
Factory-set device address	PRC487: 4 – 107TD47: 3
Display, characters	LCD, illuminated, 2 x 16 characters

Switching elements (alarm contacts)

Number of changeover contacts	2
Operating principle	N/C operation (1 x N/C or N/O operation selectable)

Contact data acc. to IEC 60947-5-1

Rated operational voltage U_e	AC 230 V / DC 220 V
Rated operational current I_e	AC 5 A / DC 0.2 A
Utilization category	AC 14/DC 12
Electrical service life, number of cycles	10.000
Minimum contact load	1 mA at AC / DC > 10 V

Terminals

Control section

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/AWG 28-12
Stripping length	8…9 mm

Power supply section

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	6…35 mm²/AWG 8-2
Stripping length	23 mm

Outgoing circuits

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/4 mm²/AWG 28-12
Stripping length	6…7 mm

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Product standards	
Insulation monitoring	IEC 61557-8
Load and temperature monitoring	IEC 60364-7-710; DIN VDE 0100-710
Changeover module	IEC 60364-7-710; DIN VDE 0100-710 IEC 60947-6-1
Distribution cabinet	IEC 60439-1
Isolating transformer	IEC 60364-7-710; DIN VDE 0100-710; IEC 61558-1
Isolating transformer	IEC 60364-7-710; DIN VDE 0100-710; IEC 61558-1 IEC 61558-2-15
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Long-time storage	1K4
Ambient temperature, operation	- 10 °C…+ 55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M1
Long-time storage	1M3
Operating mode	continuous operation
Mounting position	vertical
Schematic diagram/circuit diagram	Documentation will be created according to project-specific and customer-specific requirements
Weight/power consumption	see ordering information

IT system floor-standing distribution cabinet Series ...-IPS-F

for supplying power to medical locations in accordance with IEC 60364-7-710

S-IPS-F

Device features

- Complete standardized IT system featuring
  - 3.15…8 kVA Isolating transformer
  - Insulation, load, temperature and connection monitoring
  - Main isolator switch
  - 6 subcircuits with 2-pole circuit-breakers / IT system (max. 18)
  - Power supply unit for alarm indicator and operator panels
- Time saving as the floor-standing distribution cabinets are supplied prewired and factory tested
- Versions for 1…4 IT systems in one enclosure
- Designed in accordance with the requirements of applicable standards
- in and out going wires are terminated by screwless type/cage clamp spring terminals or as per customers specification
- Exchange of information via bus technology
- Short delivery times

Application

The IT system distribution cabinet in the IPS-F series supply electrical power to group 2 medical locations. In such locations, according to the requirements of

- IEC 60364-7-710
  for circuits supplying medical electrical Equipment and systems intended for life support, surgical applications and other electrical equipment located in the “patient environment”

the use of the IT system with insulation monitoring and load current monitoring (IEC 60364-7-710) is recommended. This requirement applies for example for anaesthetic rooms, operating theatres, operating preparation rooms, operating plaster rooms, operating recovery rooms, heart catheterization rooms, intensive care rooms, angiographic examination rooms, premature baby rooms.

The distribution cabinet of the IPS-F series feature all necessary components and are supplied prewired to terminals, thereby drastically reducing the time needing to be spent on installation and commissioning. The completely factory tested cabinets do comply with our high quality and safety requirements and ISO9001 standard.

Built-in components in accordance with IEC 60364-7-710

The IPS-F series distribution cabinet feature the following components:

- 3.15…8 kVA Isolating transformer (10 kVA optional)
- Insulation, load, and temperature monitoring device 107TD47
- Main isolator switch
- 6 x 2-pole circuit breakers / IT system (max. 18 breakers / IT system)
- 1 Load current transformer
- 1 Equipotential bonding terminals
- Power supply for 2 MK2430 or 1 MK800 alarm indicator and operator panel(s)

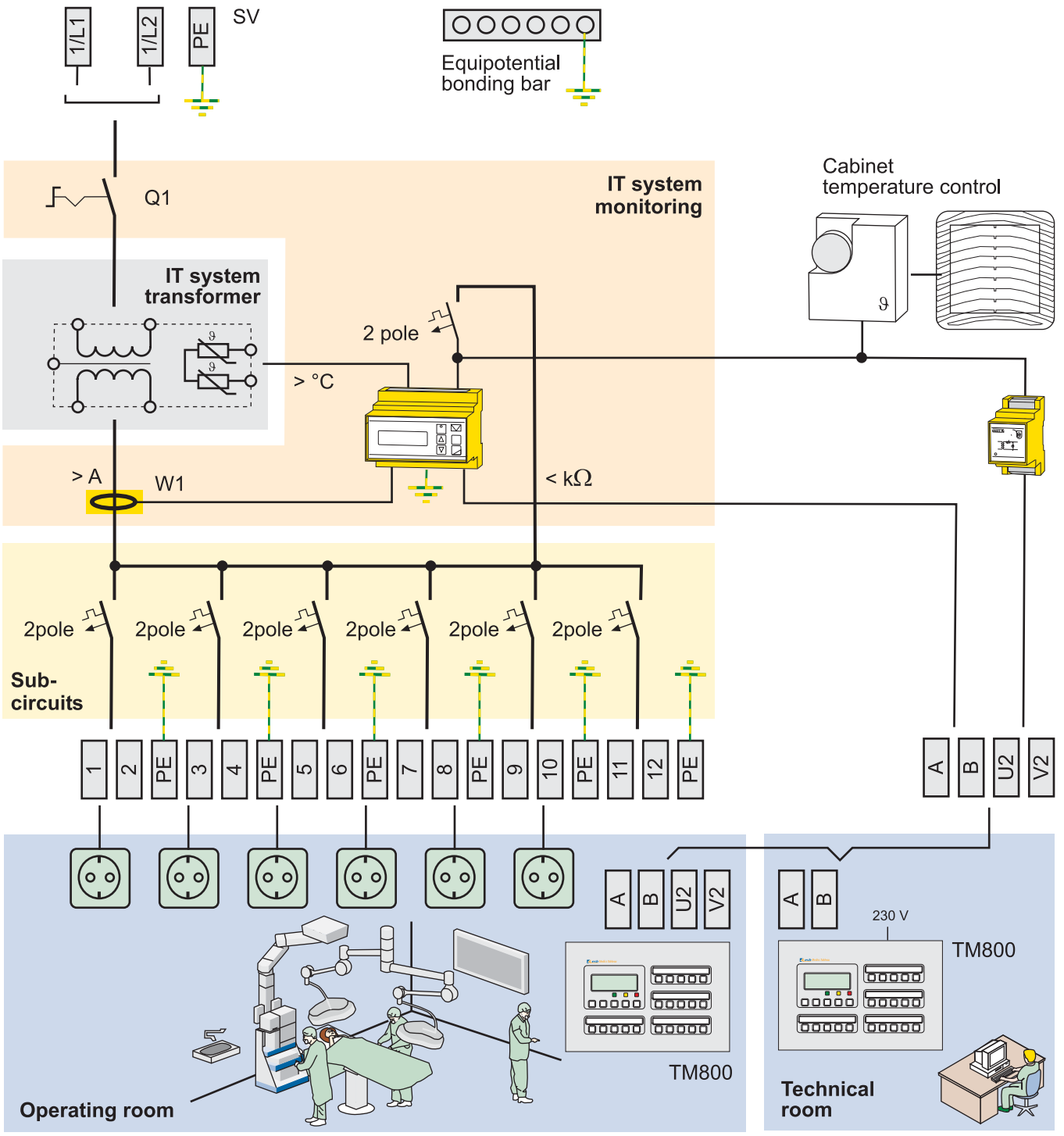
Ventilation filters and fans are mounted into the cabinet door.

Insulation, load and temperature monitoring

The 107TD47 insulation monitoring device continuously monitors the insulation resistance, load current and the temperature of the IT system transformer. If one or a number of response values have been reached (insulation resistance, load current, temperature), the alarm relay will switch and a corresponding message will appear. The connecting cables to the system and PE, as well as to the measuring current transformer and temperature sensor, are permanently monitored. In the event of wire breakage or short circuit, of the current transformer an alarm will come on. The patented AMP measuring technique is used in order to exclude the possibility of insulation monitoring being impaired by DC components.

Messages displayed in plain text

The unique status, warning and fault messages are displayed in plain text.
The MK2430/MK800 alarm indicator and test combination or TM alarm indicator and operator panel must to be installed in a suitable location in the medical location and permanently monitored by medical staff. A twisted pair shielded bus cable is used to connect the IPS distribution cabinet to the alarm indicator panels.



Overview wiring diagram

Technical data floor-standing distribution cabinets Series…-IPS-F

Distribution cabinet data

Cabinet range	ABB / Striebel & John
Cabinet type	Tri Line R, floor-standing cabinet with door
Degree of protection	max. IP54*
Protection class	Class I (earthed)
Ventilation	fan and filter in the distribution cabinet door, on the top and bottom
Doors and side panels	sheet steel 1.5…2 mm
Door	right hinged
Door lock	lock with double bit insert
Paint finish	RAL 7035 (light grey)

Installation data

Type of installation	free-standing
Dimensions / weight / power consumption	see table

Type of wiring

Terminal area	at the top
Cable entry	via gland plates/optional closed cover
Cable duct	none
Protective / neutral conductor	PE terminals, isolating terminals ≤ 10 mm²
Conductor colours	acc. to IEC 60446
Conductors	halogen-free

Connection type

Connection method	typically screwless-type connection/ cage clamp spring terminal / or as specified

Labeling

Devices	adhesive labels acc. to IEC 61346-2
Distribution cabinet	adhesive labels, black type on a white
System type labelling	according to IEC

System data

Type of distribution system	IT system
Nominal voltage	AC 230 V / 50…60 Hz

Insulation monitoring

Adjustable response value R_{an1}	50 … 500 kΩ
Hysteresis	≤ 25 %
Response time t_{an} at $R_F = 0.5 \times R_{an}$ and $C_e = 1$ µF	≤ 3 s
Max. permissible system leakage capacitance	≤ 5 µF
Measuring voltage U_m	12 V
Measuring current I_m (at $R_F = 0$ Ω)	≤ 50 µA
Internal DC resistance R_i	≥ 240 kΩ
Impedance Z_i at 50 Hz	≥ 200 kΩ
Permissible external DC voltage U_{fg}	≤ DC 375 V

Overload monitoring

Adjustable response value	5…50 A
Hysteresis	4 %
Temperature influence	≤ 0.15 % / °C

Overtemperature monitoring

Response value	4 kΩ
Release value	1.6 kΩ
PTC resistors acc. to DIN 44081	max. 6 in series

Interfaces

Interface / protocol	RS-485 / BMS
Connection terminals	A/B
Max. cable length	≤ 1200 m
Recommended cable (shielded twisted pair, shield connected to PE at one end)	J-Y(St)Y 2 x 0.8
Terminating resistor	120 Ω (0.25 W)

Switching elements (alarm contacts 107TD47)

Switching elements	1 changeover contact
Operating principle, adjustable	N/C or N/O operation
Electrical endurance, number of cycles	12000
Rated contact voltage	AC 250 V/DC 300 V
Making capacity	AC/DC 5 A
Breaking capacity	2 A, AC 230 V, cos phi 0.4 0.2 A, DC 220 V, L/R = 0.04 s

General data

Ambient temperature (operation, in door use)	0 °C…+ 30 °C
Ambient temperature (storage)	- 40 °C…+ 70 °C
Operating mode	continuous operation

Product standards

Insulation monitoring	IEC 61557-8
Load and temperature monitoring	IEC 60364-7-710
Insulation fault location system	IEC 61557-99
Distribution cabinet	IEC 60439-1
Isolating transformer	IEC 60364-7-710 IEC 60558-1 IEC 61558-2-15

* with filter IP31

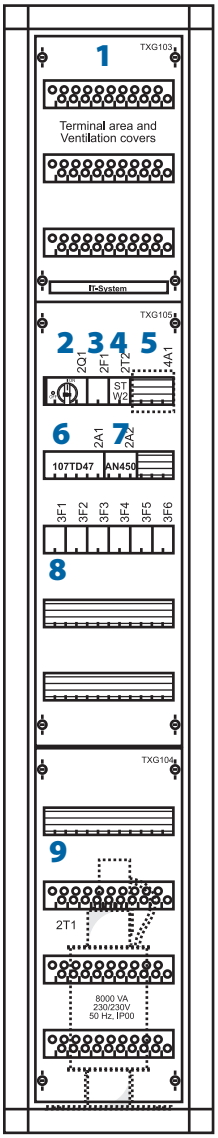
2.7

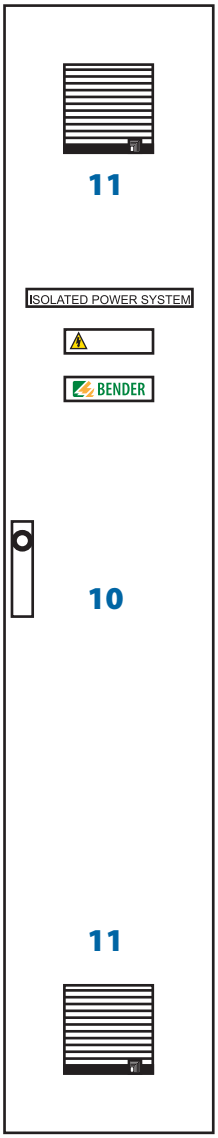
Overview / ordering information

Type	Isolating transformer	Subcircuits (typically)	Quantity IT systems	Dimensions WxHxD (mm)	Weight (kg) without base	Power-dissipation (W)
S-IPS-F	up to 8 kVA	1 x 6…18	1	374 x 1913 x 425*	155	315
D-IPS-F	up to 8 kVA	2 x 6…18	2	624 x 1913 x 425 *	250	630
T-IPS-F	up to 8 kVA	3 x 6…18	3	874 x 1913 x 425*	350	945
F-IPS-F	up to 8 kVA	4 x 6…18	4	1124 x 1913 x 425*	455	1260

* 10 kVA systems: Depth 625 mm

S-IPS-F



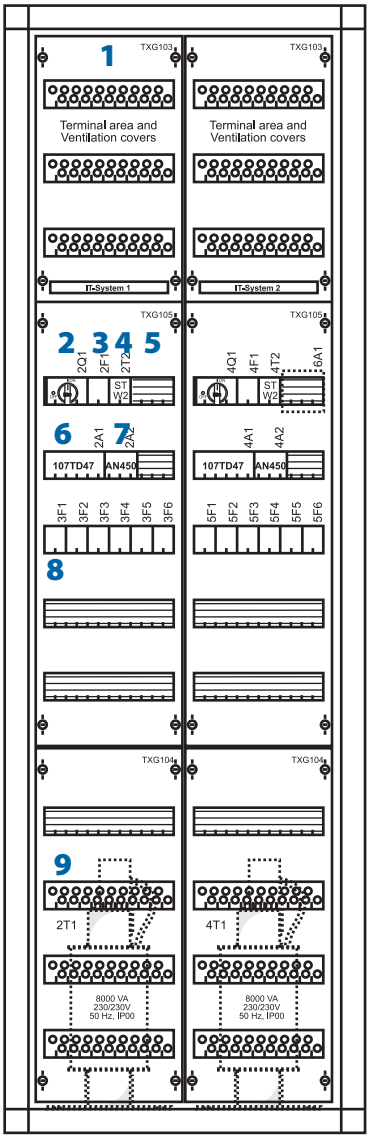


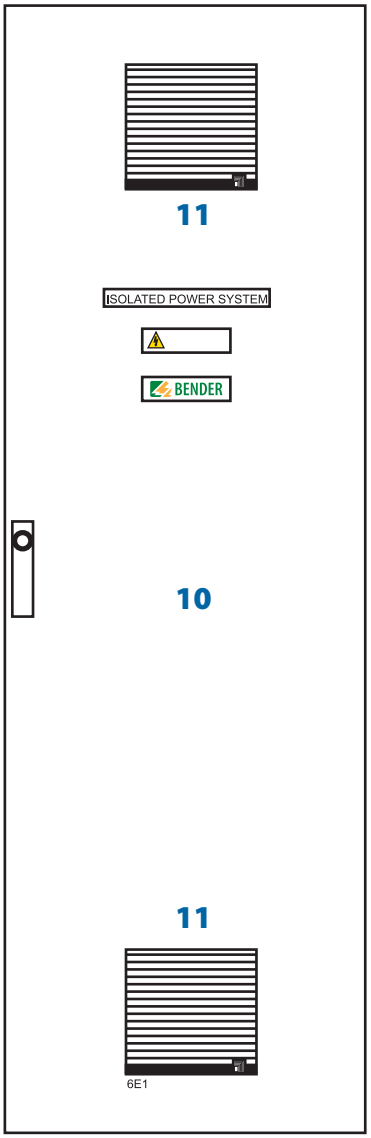
Dimensions:

up to 8 kVA	374 x 1913 x 425 (W x H x D)
10 kVA	374 x 1913 x 625 (W x H x D)

1 - Terminal area and equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internd power supply
4 - Current transformer for load Monitoring
5 - Temperature Sensor
6 - 107TD47 insulation, load and temperature monitoring
7 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
8 - 2-pole circuit-breaker subcircuits IT system (max. 18 / IT system)
9 - IT system transformer typically 3.15…8 kVA
10 - Front door
11 - Filter and fan

D-IPS-F



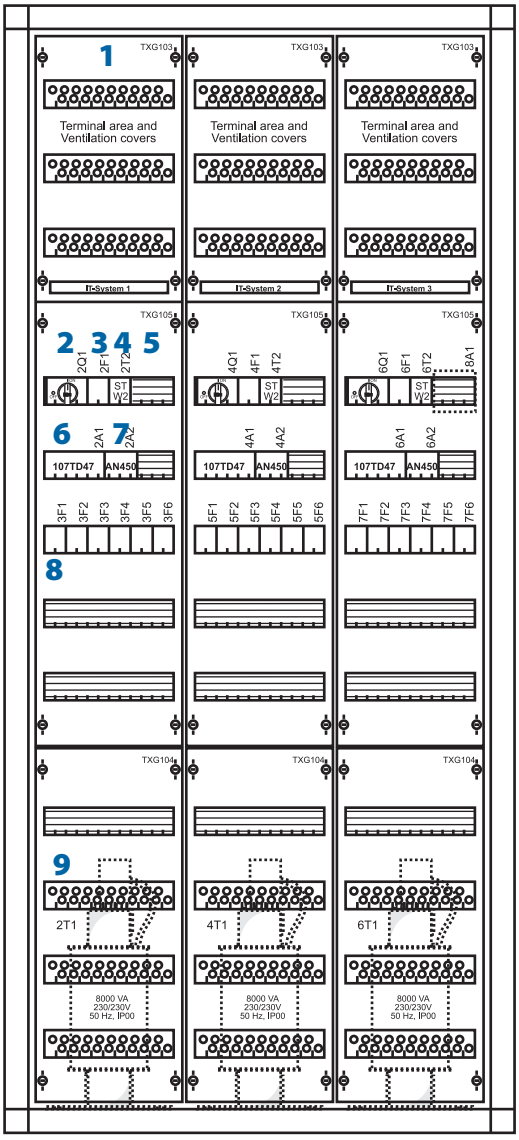


Dimensions:

up to 8 kVA	624 x 1913 x 425 (W x H x D)
10 kVA	624 x 1913 x 625 (W x H x D)

1 - Terminal area and equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internd power supply
4 - Current transformer for load Monitoring
5 - Temperature Sensor
6 - 107TD47 insulation, load and temperature monitoring
7 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
8 - 2-pole circuit-breaker subcircuits IT system (max. 18 / IT system)
9 - IT system transformer typically 3.15…8 kVA
10 - Front door
11 - Filter and fan

T-IPS-F



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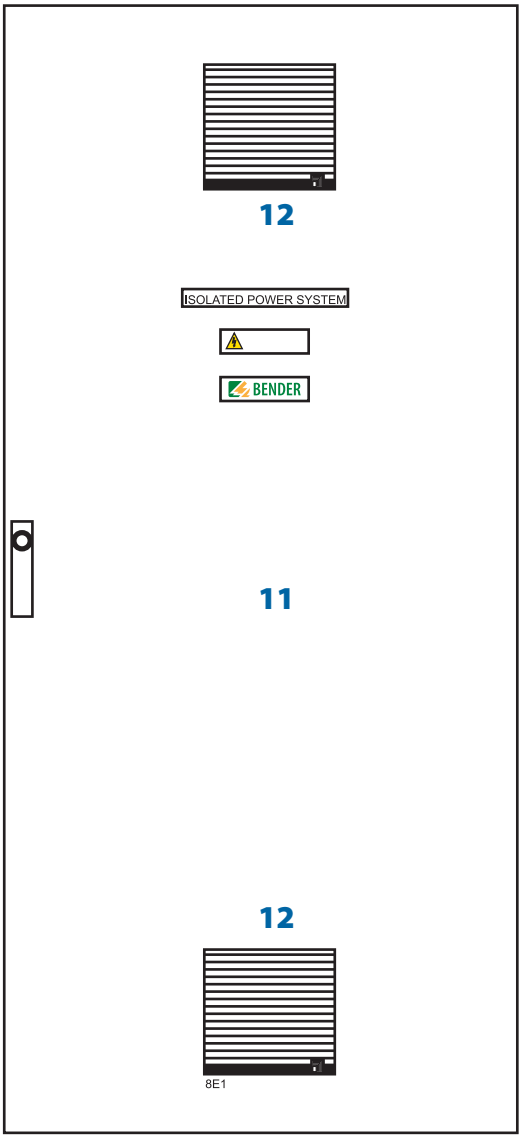
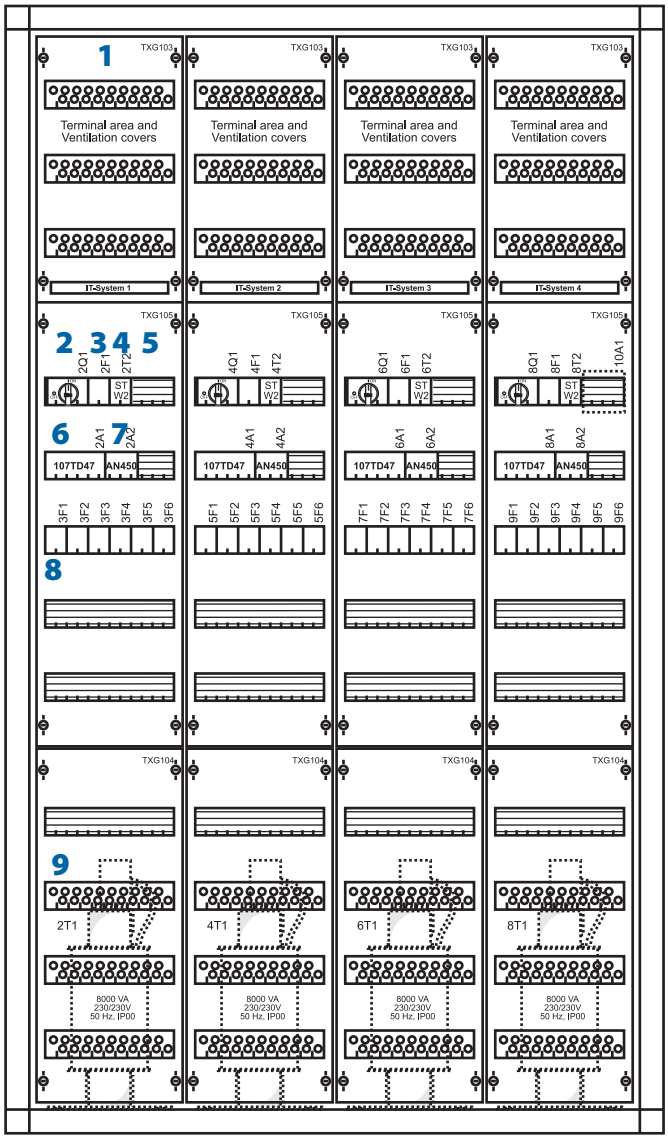


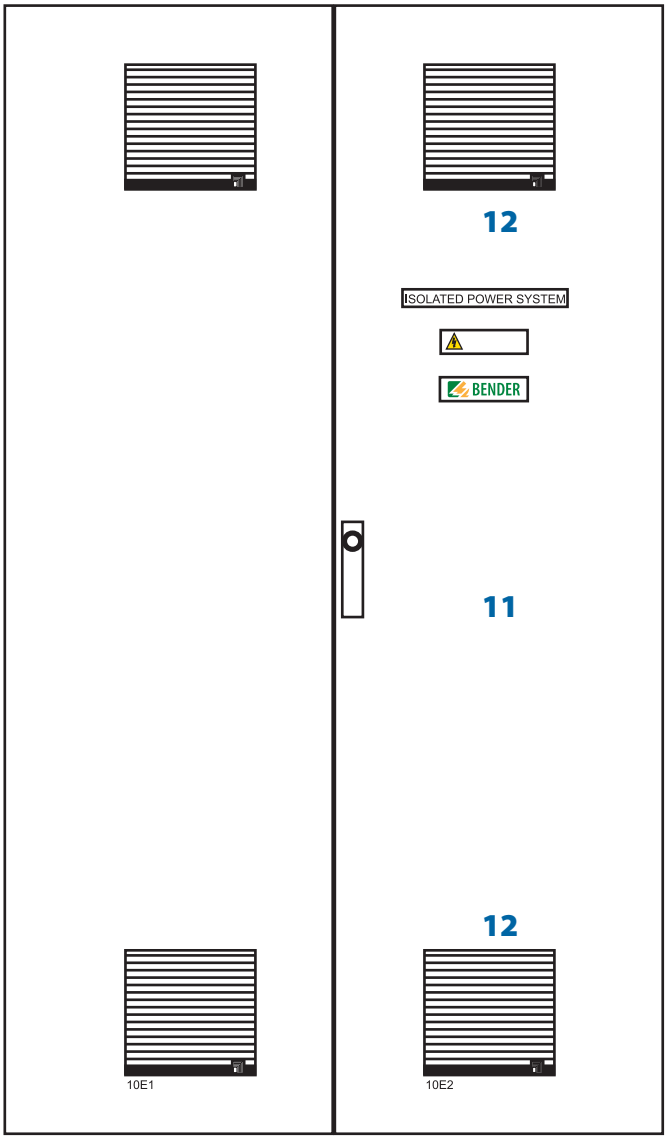
Dimensions:

up to 8 kVA	874 x 1913 x 425 (W x H x D)
10 kVA	874 x 1913 x 625 (W x H x D)

1 - Terminal area and equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internd power supply
4 - Current transformer for load Monitoring
5 - Temperature Sensor
6 - 107TD47 insulation, load and temperature monitoring
7 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
8 - 2-pole circuit-breaker subcircuits IT system (max. 18 / IT system)
9 - IT system transformer typically 3.15…8 kVA
10 - Front door
11 - Filter and fan

F-IPS-F





Dimensions:
up to 8 kVA 1124 x 1913 x 425 (W x H x D)
10 kVA 1124 x 1913 x 625 (W x H x D)

1 - Terminal area and equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internd power supply
4 - Current transformer for load Monitoring
5 - Temperature Sensor
6 - 107TD47 insulation, load and temperature monitoring
7 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
8 - 2-pole circuit-breaker subcircuits IT system (max. 18 / IT system)
9 - IT system transformer typically 3.15…8 kVA
10 - Front door
11 - Filter and fan

IT system floor-standing distribution cabinet Series ...-IPS-F/EDS

for supplying power to medical locations in accordance with IEC 60364-7-710 and featuring a built-in insulation fault location system

D-IPS-F/EDS

Device features

- Complete standardized IT system featuring
  - 3.15…8 kVA Isolating transformer
  - Insulation, load, temperature and connection monitoring
  - Main isolator switch
  - 6 subcircuits with 2-pole circuit-breakers / IT system (max. 12)
- Automatic insulation fault location system
- Power supply unit for alarm indicator and operator panels
- Time saving as the floor-standing distribution cabinets are supplied prewired and factory tested
- Versions for 1…4 IT systems in one enclosure
- Designed in accordance with the requirements of applicable standards
- in and out going wires are terminated by screwless type/cage clamp spring terminals or as per customers specification
- Exchange of information via bus technology
- Short delivery times

Application

The IT system distribution cabinet in the IPS-F series supply electrical power to group 2 medical locations. In such locations, according to the requirements of

- IEC 60364-7-710
  for circuits supplying medical electrical Equipment and systems intended for life support, surgical applications and other electrical equipment located in the “patient environment”

the use of the IT system with insulation monitoring and load current monitoring (IEC 60364-7-710) is recommended. This requirement applies for example for anaesthetic rooms, operating theatres, operating preparation rooms, operating plaster rooms, operating recovery rooms, heart catheterization rooms, intensive care rooms, angiographic examination rooms, premature baby rooms.

The distribution cabinet of the IPS-F series feature all necessary components and are supplied prewired to terminals, thereby drastically reducing the time needing to be spent on installation and commissioning. The completely factory tested cabinets do comply with our high quality and safety requirements and ISO9001 standard.

Built-in components in accordance with IEC 60364-7-710

The IPS-F series distribution cabinet feature the following components:

- 3.15…8 kVA Isolating transformer (10 kVA optional)
- Insulation, load, and temperature monitoring device 107TD47
- Main isolator switch
- 6 x 2-pole circuit breakers / IT system (max. 18 breakers / IT system)
- 1 Load current transformer
- 1 Equipotential bonding terminals
- Power supply for 2 MK2430 or 1 MK800 alarm indicator and operator panel(s)

Ventilation filters and fans are mounted into the cabinet door.

Insulation, load and temperature monitoring

The 107TD47 insulation monitoring device continuously monitors the insulation resistance, load current and the temperature of the IT system transformer. If one or a number of response values have been reached (insulation resistance, load current, temperature), the alarm relay will switch and a corresponding message will appear. The connecting cables to the system and PE, as well as to the measuring current transformer and temperature sensor, are permanently monitored. In the event of wire breakage or short circuit, of the current transformer an alarm will come on. The patented AMP measuring technique is used in order to exclude the possibility of insulation monitoring being impaired by DC components.

Insulation fault location system (EDS system)

In Group 2 medical locations featuring a large number of socket outlet circuits and/or loads (e.g. intensive care units), locating faulty circuits or loads can often be a time-consuming and difficult task for medical and technical personnel. The EDS insulation fault location system solves this problem by automatically locating the insulation fault during operation. This results in two decisive advantages: fault location and availability are optimized in terms of both time and cost, because the system remains in operation during automatic fault location.

Insulation fault location

The insulation fault location process starts when the A-ISOMETER® 107TD47 reports an insulation fault. The PGH474 test device generates a test current of max. 1 mA. This test current flows via the insulation fault location and via the earth wire (PE wire) back to the test device. The test current is detected by a measuring current transformer located on the fault path and processed by the EDS474 evaluator.

The location of the faulty circuit or load is identified by means of an assignment between the measuring current transformer/subcircuit and a unique text message, e.g. on a TM alarm indicator and operator panel, on the MK800 or the MK2430 alarm indicator and test combination.

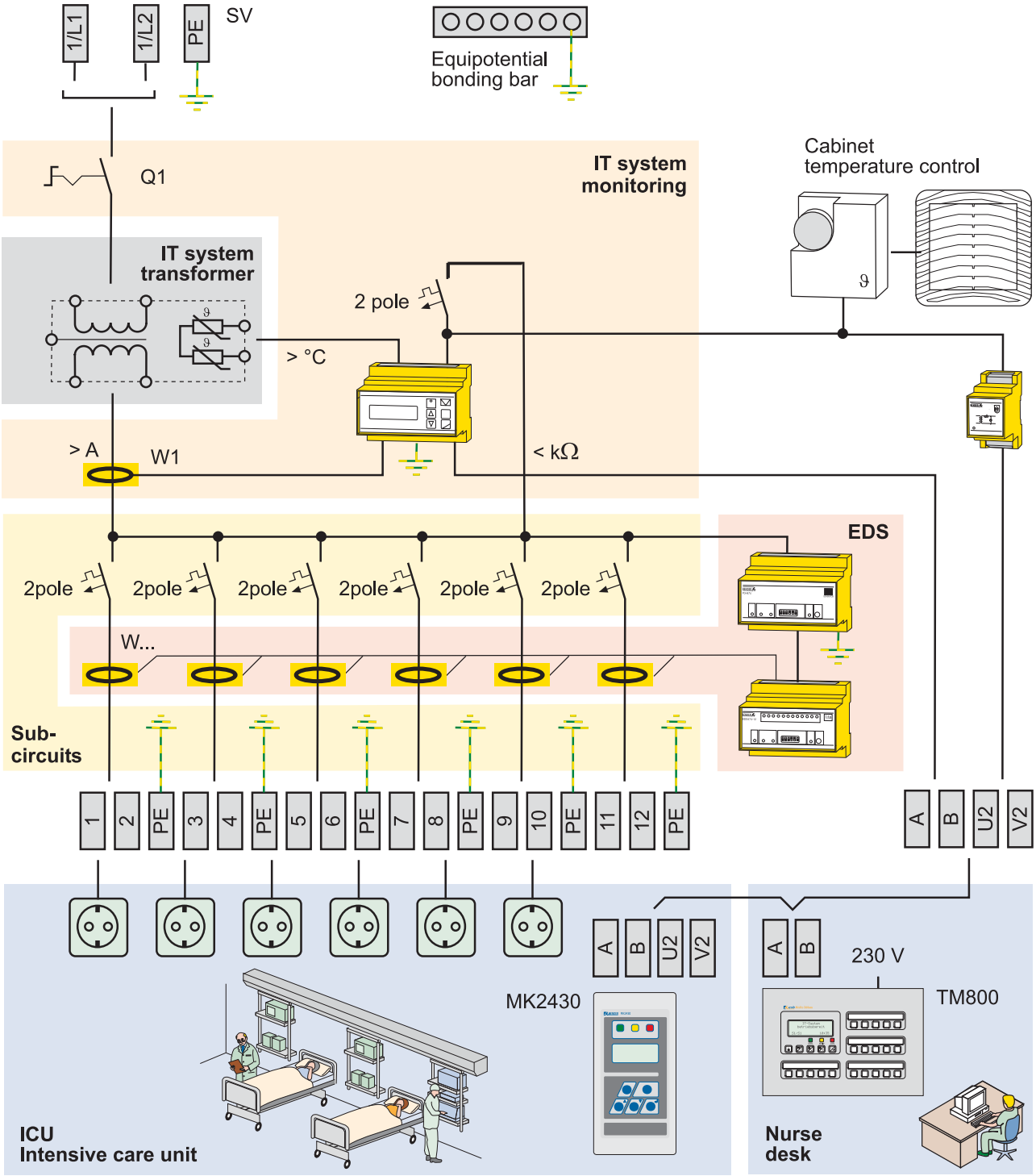
Messages displayed in plain text

The unique status, warning and fault messages are displayed in plain text. The MK2430/MK800 alarm indicator and test combination or TM alarm indicator and operator panel must be installed in a suitable location in the medical location and permanently monitored by medical staff. A twisted pair shielded bus cable is used to connect the IPS distribution cabinet to the alarm indicator panels.

Overview / ordering information

Type	Isolation transformer	Subcircuits (typically)	Quantity IT systems	Dimensions WxHxD (mm)	Weight (kg)
S-IPS-F/EDS	up to 8 kVA	1 x 6…12	1	374 x 1913 x 425*	155
D-IPS-F/EDS	up to 8 kVA	2 x 6…12	2	624 x 1913 x 425*	250
T-IPS-F/EDS	up to 8 kVA	3 x 6…12	3	874 x 1913 x 425*	350
F-IPS-F/EDS	up to 8 kVA	4 x 6…12	4	1124 x 1913 x 425*	455

* 10 kVA systems: Depth 625 mm



Overview wiring diagram

Technical data floor-standing distribution cabinets Series…-IPS-F/EDS

Distribution cabinet data

Cabinet range	ABB / Striebel & John
Cabinet type	Tri Line R, floor-standing cabinet with door
Degree of protection	max. IP54*
Protection class	Class I (earthed)
Ventilation	fan and filter in the distribution cabinet door, top and bottom
Doors and side panels	sheet steel 1.5…2 mm
Door	right-hinged
Door lock	lock with double bit insert
Paint finish	RAL 7035 (light grey)

Installation data

Type of installation	free-standing
Dimensions / weight / power consumption	see table

Type of wiring

Terminal area	at the top
Cable entry	via gland plates / optional closed cover
Cable duct	none
Protective / neutral conductor	PE terminals, isolating terminals ≤ 10 mm²
Conductor colours	acc. to IEC 60446
Conductors	halogen-free

Connection type

Connection method	typically: screwless-type connection/ cage clamp spring terminals / or as specified

Labeling

Devices	adhesive labels, IEC 61346-2
Distribution cabinet	adhesive labels, black type on a white
System type labelling	according to IEC

System data

Type of distribution system	IT system
Nominal voltage	AC 230 V / 50…60 Hz

Insulation monitoring

Adjustable response value R_{an1}	50 … 500 kΩ
Hysteresis	≤ 25 %
Response time t_{an} at $R_F = 0.5 \times R_{an}$ and $C_e = 1$ µF	≤ 3 s
Max. permissible system leakage capacitance	≤ 1 µF
Measuring voltage U_m	12 V
Measuring current I_m (at $R_F = 0$ Ω)	≤ 50 µA
Internal DC resistance R_i	≥ 240 kΩ
Impedance Z_i at 50 Hz	≥ 200 kΩ
Permissible external DC voltage U_{fg}	≤ DC 375 V

Overload monitoring

Adjustable response value	5 … 50 A
Hysteresis	4 %
Temperature influence	≤ 0.15 % / °C

Overtemperature monitoring

Response value	4 kΩ
Release value	1.6 kΩ
PTC resistors acc. to DIN 44081	max. 6 in series

Insulation fault location

Test current IT	≤ 1 mA
Test pulse/break	2 s / 4 s

Interfaces

Interface / protocol	RS-485 / BMS
Connection terminals	A/B
Max. cable length	≤ 1200 m
Recommended cable (shielded twisted pair, shield connected to PE at one end)	J-Y(St)Y 2 x 0.8
Terminating resistor	120 Ω (0.25 W)

Switching elements (alarm contacts 107TD47)

Switching elements	1 changeover contact
Operating principle, adjustable	N/C or N/O operation
Electrical endurance, number of cycles	12000
Rated contact voltage	AC 250 V/DC 300 V
Making capacity	AC/DC 5 A
Breaking capacity	2 A, AC 230 V, cos phi 0.4 0.2 A, DC 220 V, L/R = 0.04 s

General data

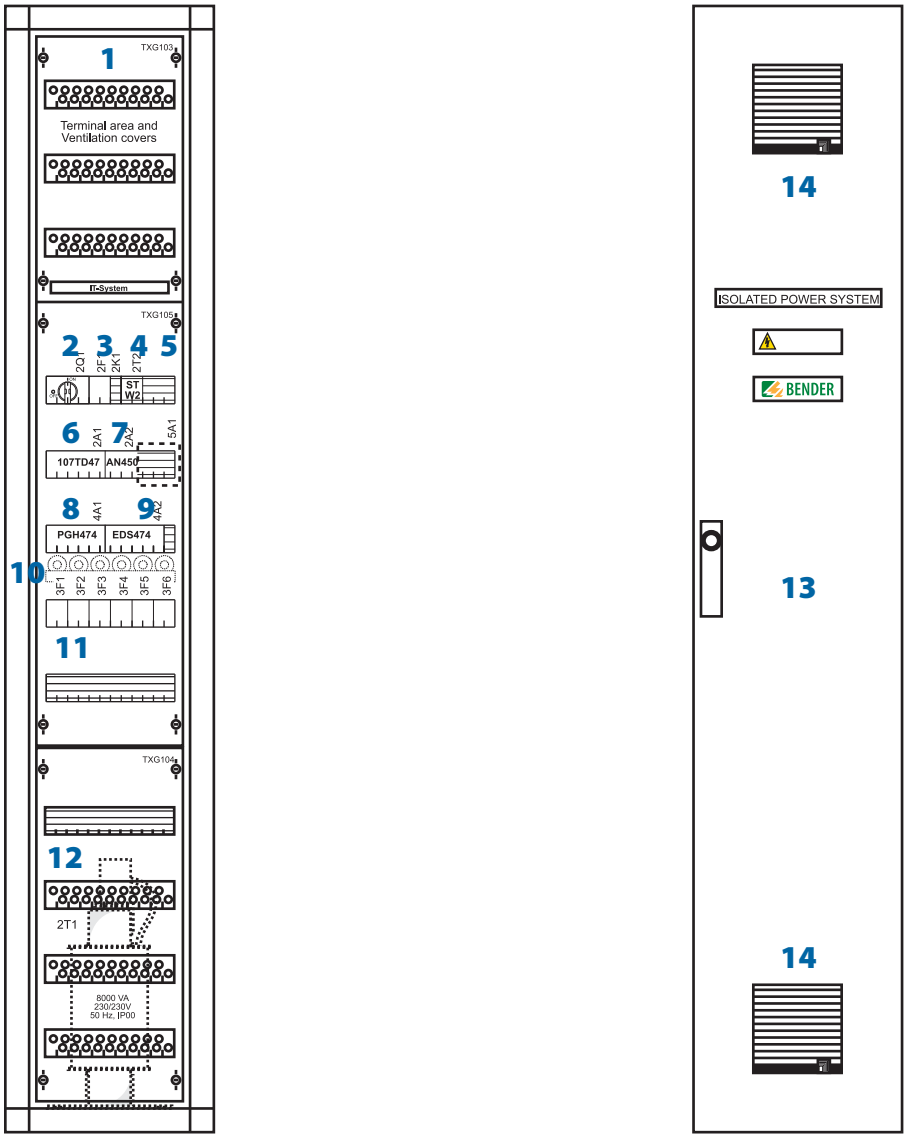
Ambient temperature (operation in door use)	0 °C…+ 30 °C
Ambient temperature (storage)	- 40 °C…+ 70 °C
Operating mode	continuous operation

Product standards

Insulation monitoring	IEC 61557-8
Load and temperature monitoring	IEC 60364-7-710
Insulation fault location system	IEC 61557-9
Isolating transformer	IEC 60364-7-710 IEC 61558-1 IEC 61558-2-15

* with filter IP31

S-IPS-F/EDS

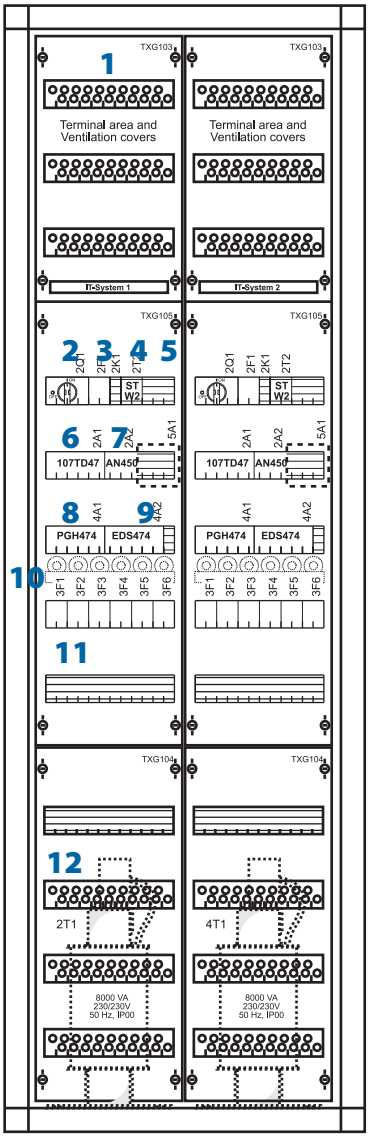


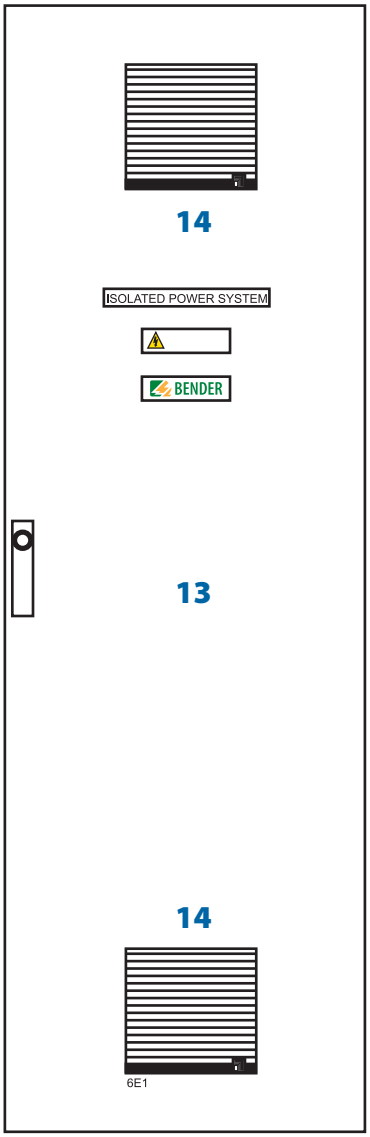
Dimensions:

up to 8 kVA	374 x 1913 x 425 (W x H x D)
10 kVA	374 x 1913 x 625 (W x H x D)

1 - Terminal area and equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internal power supply
4 - Current transformer for load monitoring
5 - Temperatur sensor
6 - 107TD47 insulation, load and temperature monitoring device
7 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
8 - Insulation fault test device
9 - Insulation fault evaluator
10 - Measuring current transformer EDS system
11 - Subcircuits IT system: 2-pole circuit-breakers (max. 12 / IT system)
12 - IT system transformer
13 - Front door
14 - Filter and fan

D-IPS-F/EDS



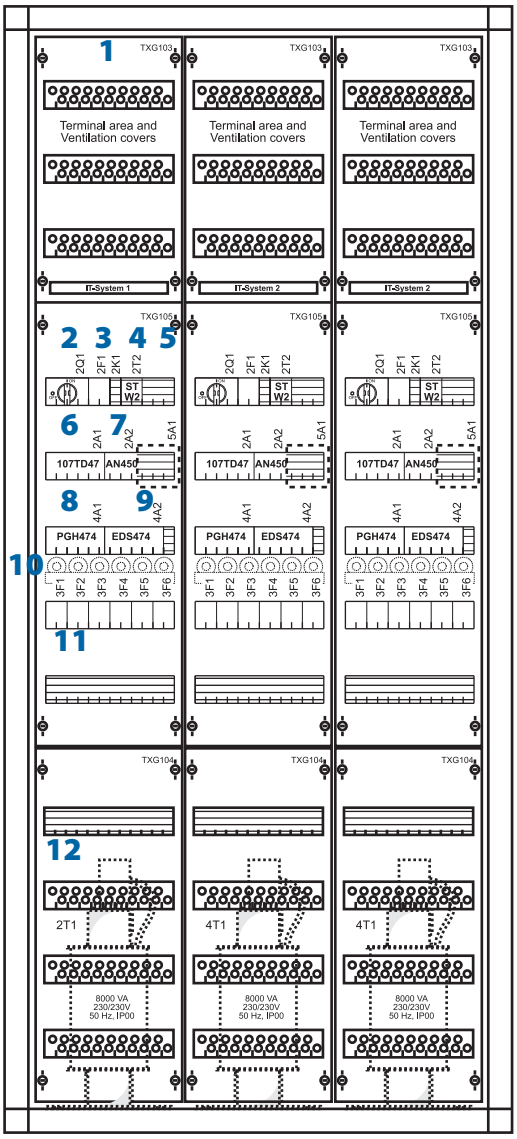


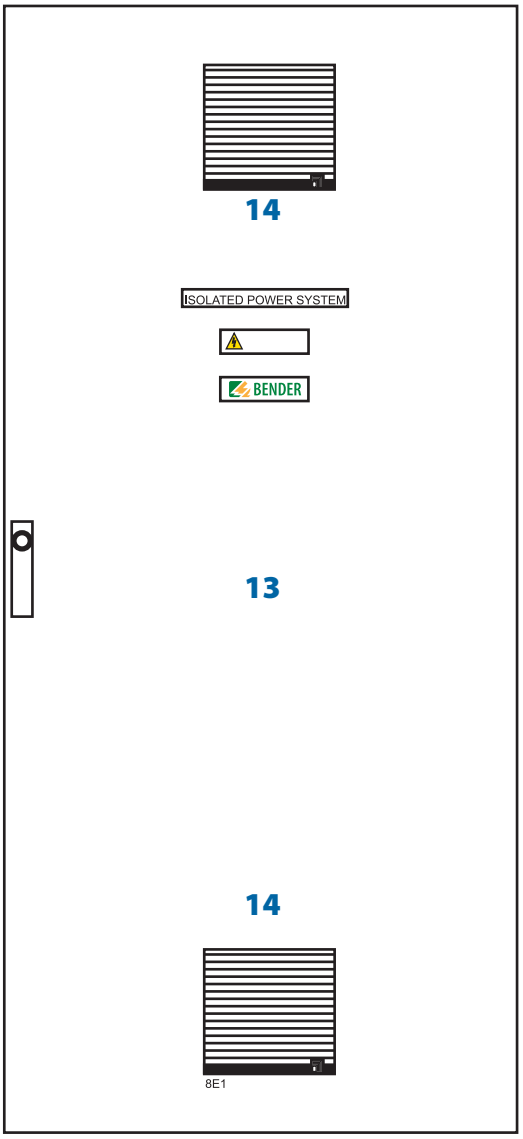
Dimensions:

up to 8 kVA	624 x 1913 x 425 (W x H x D)
10 kVA	624 x 1913 x 625 (W x H x D)

1 - Terminal area and equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internal power supply
4 - Current transformer for load monitoring
5 - Temperatur sensor
6 - 107TD47 insulation, load and temperature monitoring device
7 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
8 - Insulation fault test device
9 - Insulation fault evaluator
10 - Measuring current transformer EDS system
11 - Subcircuits IT system: 2-pole circuit-breakers (max. 12 / IT system)
12 - IT system transformer
13 - Front door
14 - Filter and fan

T-IPS-F/EDS



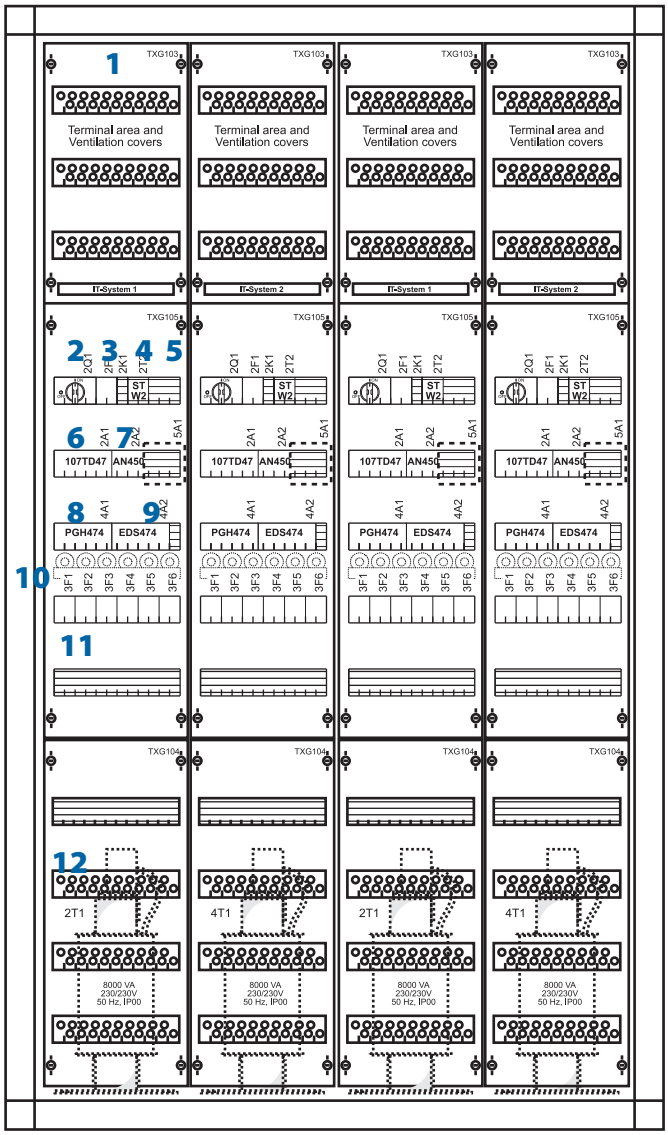


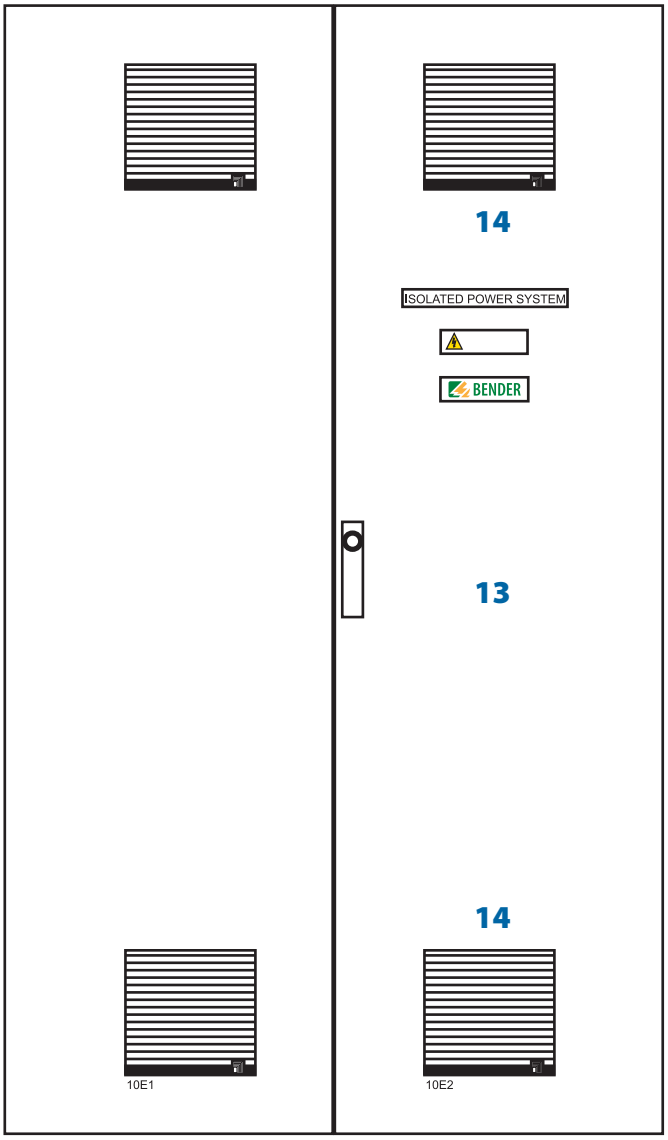
Dimensions:

up to 8 kVA	874 x 1913 x 425 (W x H x D)
10 kVA	874 x 1913 x 625 (W x H x D)

1 - Terminal area and equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internal power supply
4 - Current transformer for load monitoring
5 - Temperatur sensor
6 - 107TD47 insulation, load and temperature monitoring device
7 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
8 - Insulation fault test device
9 - Insulation fault evaluator
10 - Measuring current transformer EDS system
11 - Subcircuits IT system: 2-pole circuit-breakers (max. 12 / IT system)
12 - IT system transformer
13 - Front door
14 - Filter and fan

F-IPS-F/EDS





Dimensions:

up to 8 kVA	1124 x 1913 x 425 (W x H x D)
10 kVA	1124 x 1913 x 625 (W x H x D)

1 - Terminal area and equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internal power supply
4 - Current transformer for load monitoring
5 - Temperatur sensor
6 - 107TD47 insulation, load and temperature monitoring device
7 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
8 - Insulation fault test device
9 - Insulation fault evaluator
10 - Measuring current transformer EDS system
11 - Subcircuits IT system: 2-pole circuit-breakers (max. 12 / IT system)
12 - IT system transformer
13 - Front door
14 - Filter and fan

IT system wall-mounted distribution boards Series…-IPS-W and -IPS-RW

for supplying power to medical locations in accordance with IEC 60364-7-710

S-IPS-W

Device features

- Complete standardized IT system featuring
  - Insulation, load, temperature and connection monitoring
  - Main isolator switch
  - 6 subcircuits with 2-pole circuit-breakers / IT system (max. 12)
  - Power supply unit for alarm indicator and operator panels
- Time saving as the wall-mounted distribution boards are supplied prewired and factory tested
- Versions for 1…3 IT systems in one enclosure
- Designed in accordance with the requirements of applicable standards
- in and out going wires are terminated by screwless type/cage clamp spring terminals or as per customers specification
- Exchange of information via bus technology
- Short delivery times
- Surface wall-mounted and flush/recessed wall mounted for dry/cavity wall mounting

Application

The IT system distribution boards in the IPS series supply electrical power to group 2 medical locations. In such locations, according to the requirements of

- IEC 60364-7-710
  for circuits supplying medical electrical Equipment and systems intended for life support, surgical applications and other electrical equipment located in the “patient environment”

the use of the IT system with insulation monitoring and load current monitoring (IEC 60364-7-710) is mandatory. This requirement applies for example for anaesthetic rooms, operating theatres, operating preparation rooms, operating plaster rooms, operating recovery rooms, heart catheterization, intensive care rooms, angiographic examination rooms, premature baby rooms.

The distribution cabinet of the IPS-W series feature all necessary components and are supplied prewired to terminals, thereby drastically reducing the time needing to be spent on installation and commissioning. The completely factory tested cabinets do comply with our high quality and safety requirements and ISO9001 standard.

Built-in components in accordance with IEC 60364-7-710

The IPS-W series distribution boards feature the following components:

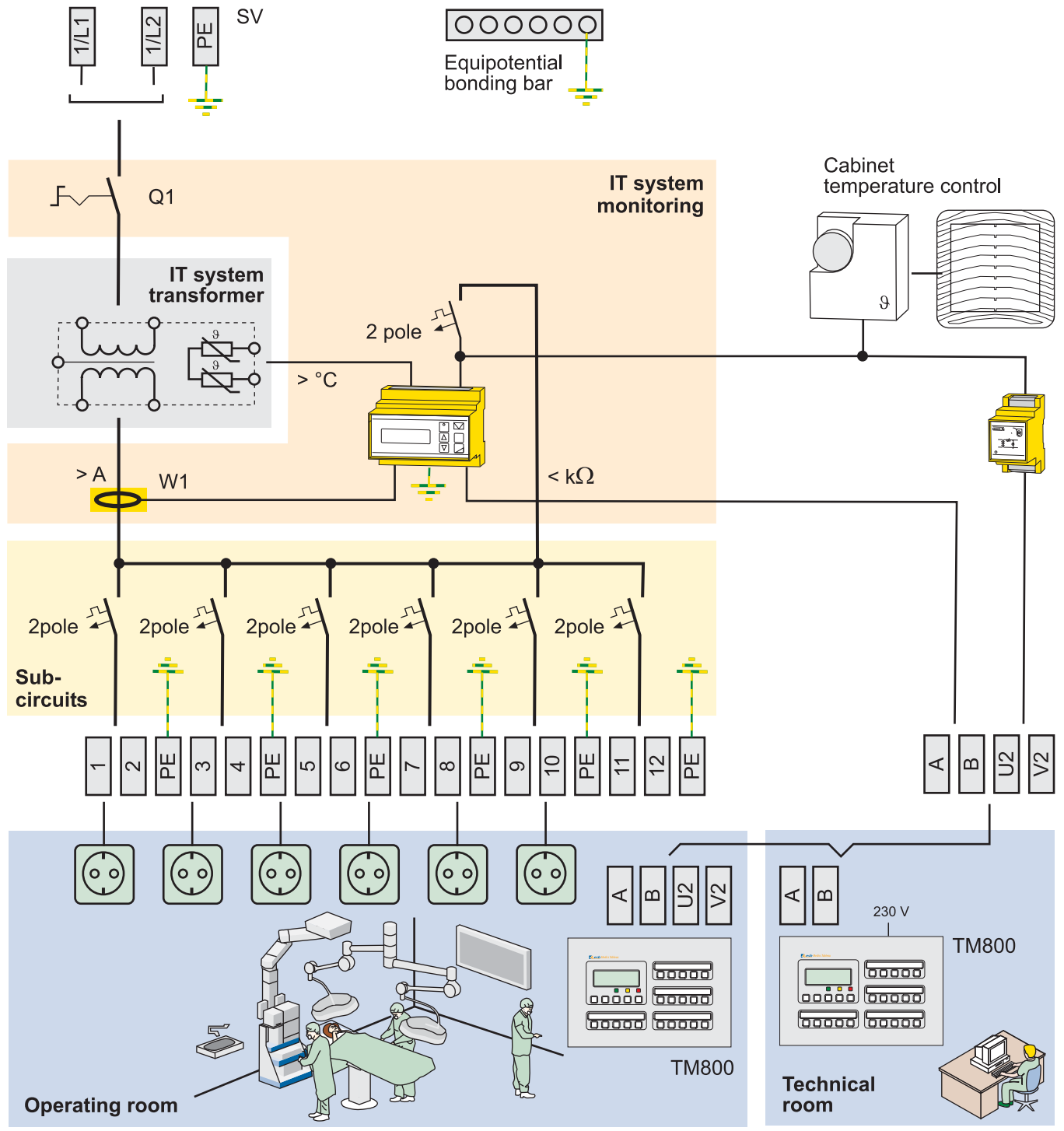
- 107TD47 insulation, load and temperature monitoring device
- Main isolator switch
- typically 6 x 2-pole circuit breakers / IT system
- 1 Load current transformer
- 1 Equipotential bonding terminals
- Power supply for 2 MK2430 or 1 MK800 alarm indicator and operator panel(s)

Insulation, load and temperature monitoring

The 107TD47 insulation monitoring device continuously monitors the insulation resistance, load current and the temperature of the IT system transformer. If one or a number of response values have been reached (insulation resistance, load current, temperature), the alarm relay will switch and a corresponding message will appear. The connecting cables to the system and PE, as well as to the measuring current transformer and temperature sensor, are permanently monitored. In the event of wire breakage or short circuit, of the current transformer an alarm will come on. The patented AMP measuring technique is used in order to exclude the possibility of insulation monitoring being impaired by DC components.

Messages displayed in plain text

The unique status, warning and fault messages are displayed in plain text.
The MK2430/MK800 alarm indicator and test combination or TM alarm indicator and operator panel must to be installed in a suitable location in the medical location and permanently monitored by medical staff. A twisted pair shielded bus cable is used to connect the IPS distribution cabinet to the alarm indicator panels.



Overview wiring diagram

Technical data wall-mounted distribution boards Series…-IPS-W, -IPS-RW

Distribution board data

Cabinet range	ABB / Striebel & John
Cabinet type	AT + U series, surface/flush/recessed mounted with door and inspection window
Degree of protection	IP43/31*
Protection class	isolated
Doors and walls	sheet steel 1.5…2 mm
Door	right-hinged
Door lock	lock with key
Paint finish	RAL 9016 (white)

Installation data

Type of installation	wall/dry/cavity wall mounting
Dimensions / weight / power consumption	see table

Type of wiring

Terminal area	at the top
Cable entry	via the gland plates
Cable duct	none
Protective / neutral conductor	PE terminals, isolating terminals ≤ 10 mm²
Conductor colours	acc. to IEC 60446
Conductors	halogen-free

Connection type

Connection method	typically: screwless-type connection/ cage clamp spring terminals/or as specified

Labeling

Devices	adhesive labels, IEC 61346-2
Distribution board	adhesive labels, black type on a white
Network type labelling	acc. to IEC

System data

Type of distribution system	IT system
Nominal voltage	AC 230 V / 50…60 Hz

Insulation monitoring

Adjustable response value R_{an1}	50 … 500 kΩ
Hysteresis	≤ 25 %
Response time t_{an} at R_F = 0.5 x R_{an} and C_e = 1 µF	≤ 3 s
Max. permissible system leakage capacitance	≤ 5 µF
Measuring voltage U_m	12 V
Measuring current I_m (at R_F = 0 Ω)	≤ 50 µA
Internal DC resistance R_i	≥ 240 kΩ
Impedance Z_i at 50 Hz	≥ 200 kΩ
Permissible external DC voltage U_{fg}	≤ DC 375 V

Overload monitoring

Adjustable response value	5 … 50 A
Hysteresis	4 %
Temperature influence	≤ 0.15 % / °C

Overtemperature monitoring

Response value	4 kΩ
Release value	1.6 kΩ
PTC resistors acc. to DIN 44081	max. 6 in series

Interfaces

Interface / protocol	RS-485 / BMS
Connection terminals	A/B
Max. cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE at one end)	J-Y(St)Y 2 x 0.8
Terminating resistor	120 Ω (0.25 W)

Switching elements (alarm contacts 107TD47)

Switching elements	1 changeover contact
Operating principle, adjustable	N/C or N/O operation
Electrical endurance, number of cycles	12000
Rated contact voltage	AC 250 V/DC 300 V
Making capacity	AC/DC 5 A
Breaking capacity	2 A, AC 230 V, cos phi 0.4 0.2 A, DC 220 V, L/R = 0.04 s

General data

Ambient temperature (operation, in door use)	- 10 °C…+ 50 °C
Ambient temperature (storage)	- 40 °C…+ 70 °C
Operating mode	continuous operation

Product standards

Insulation monitoring	IEC 61557-8
Load and temperature monitoring	IEC 60364-7-710
Distribution board	IEC 60439-1

* with filter IP31

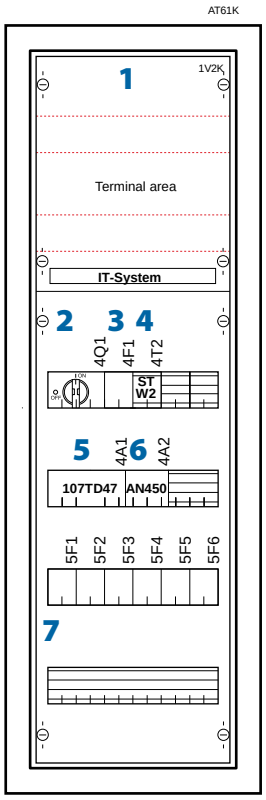
2.7

Overview / ordering information

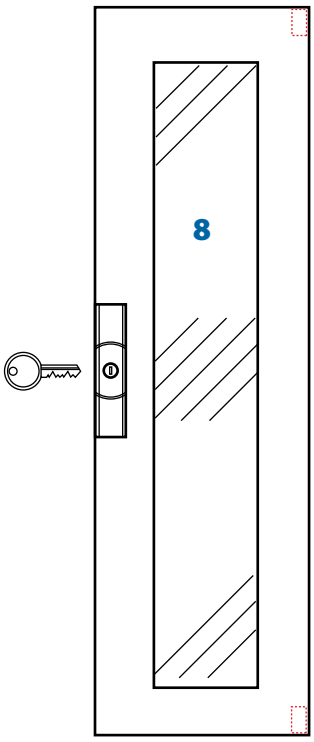
Type	Subcircuits (typically)	Quantity IT systems	Dimensions WxHxD (mm)	Weight (kg)
S-IPS-W	1 x 6…12	1	324 x 974 x 140	20
S-IPS-RW	1 x 6…12	1	354 x 994 x 117	20
S-IPS-RW (12)	1 x 12	1	605 x 695 x 117	25
D-IPS-W	2 x 6…12	2	574 x 974 x 140	30
D-IPS-RW	2 x 6…12	2	605 x 995 x 117	30
T-IPS-W	3 x 6…12	3	824 x 974 x 140	40
T-IPS-RW	3 x 6…12	3	855 x 995 x 117	40

"-W" = surface wall mounted
"-RW" = flush/recessed wall mounted for dry/cavity wall mounting
28 mm bezel frame height

S-IPS-W (surface mounted)



refer to dwg #9800230



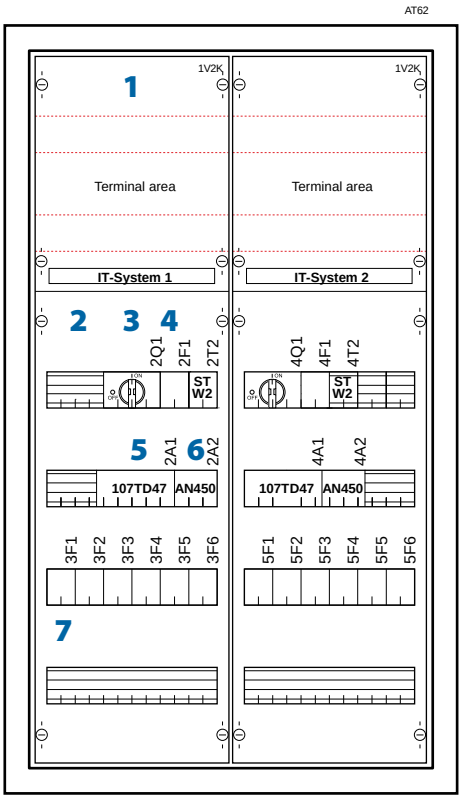
Frontview door, with window

Dimensions:

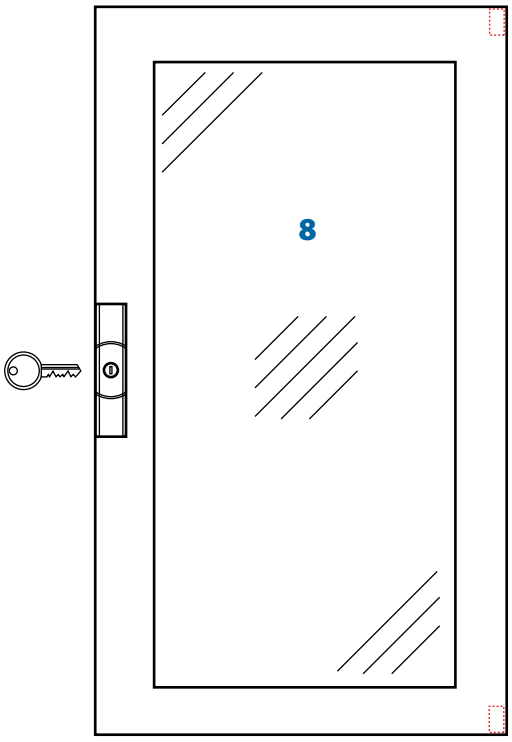
- W (dwg# 9800230)
  324 x 974 x 140 mm (W x H x D)
  surface mounted
- RW (dwg# 9800453)
  – bezel frame dimension
  355 x 995 x 117 mm (+ 28 mm bezel)
  – wall cut dimension
  310 x 984 x 120 mm

1 - Terminal area and equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internal power supply
4 - Current transformer for load monitoring
5 - 107TD47 insulation, load and temperature monitoring device
6 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
7 - IT system Subcircuits: 2-pole circuit-breakers (max. 12 breakers / IT system)
8 - Front door

D-IPS-W (surface mounted)



refer to dwg #9800231



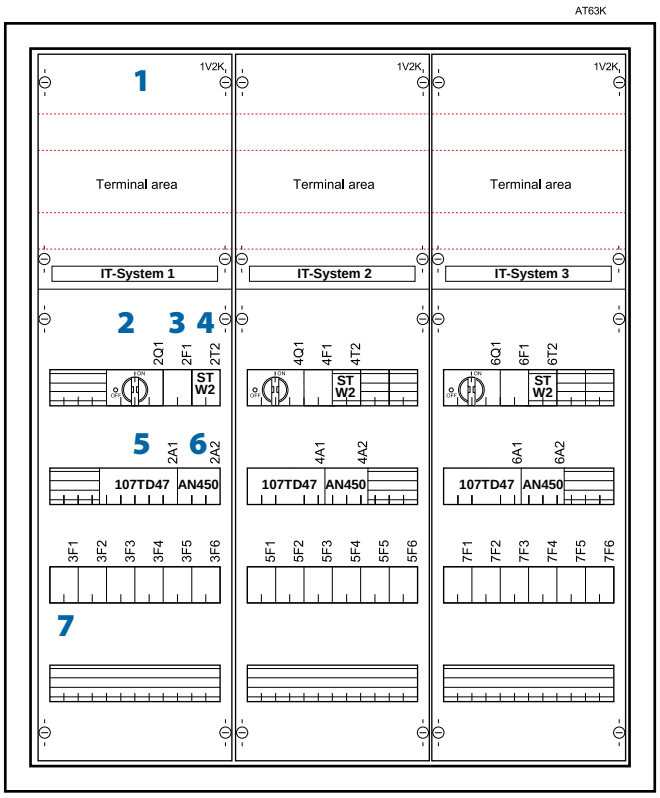
Frontview door, with window

Dimensions:

- W (dwg# 9800231)
  574 x 974 x 140 mm (W x H x D)
  surface mounted
- RW (dwg# 9800454)
  – bezel frame dimension
  605 x 995 x 117 mm (+ 28 mm bezel)
  – wall cut dimension
  560 x 984 x 120 mm

1 - Terminal area and equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internal power supply
4 - Current transformer for load monitoring
5 - 107TD47 insulation, load and temperature monitoring device
6 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
7 - IT system Subcircuits: 2-pole circuit-breakers (max. 12 breakers / IT system)
8 - Front door

T-IPS-W (surface mounted)



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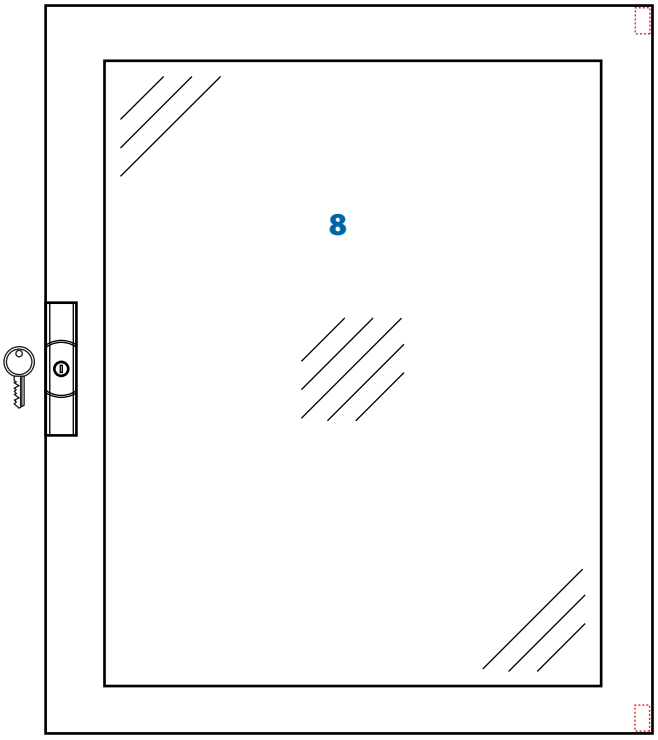


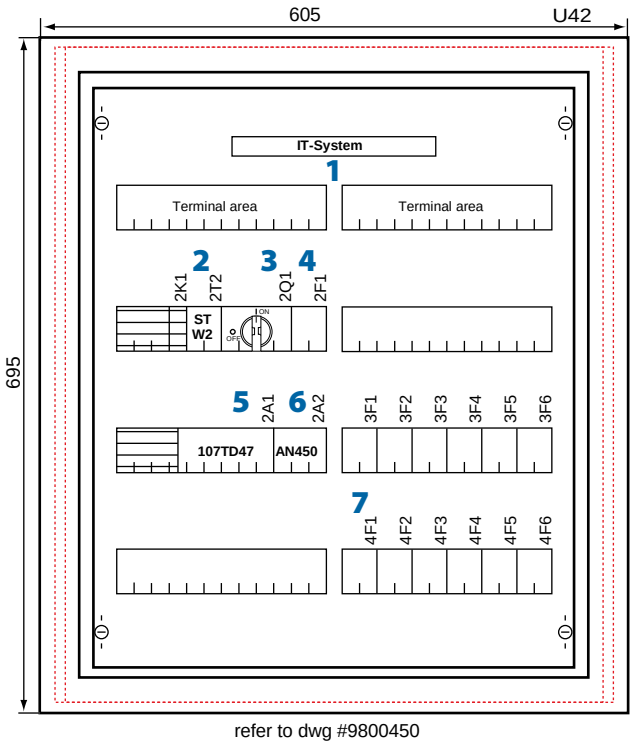
Frontview door, with window

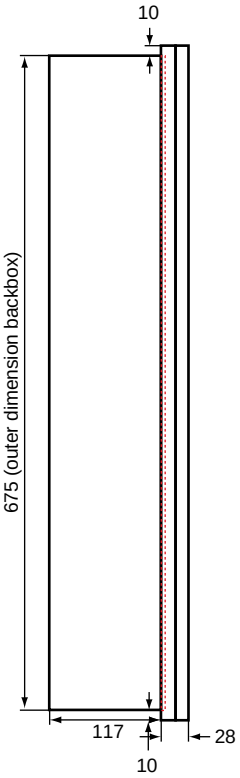
Dimensions:

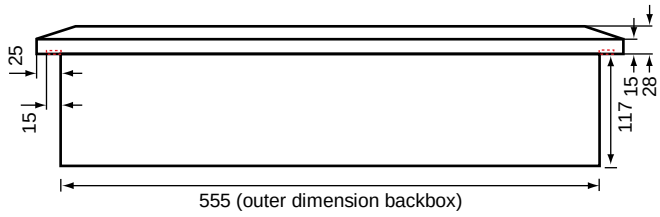
- W
  824 x 974 x 140 mm (W x H x D)
  surface mounted

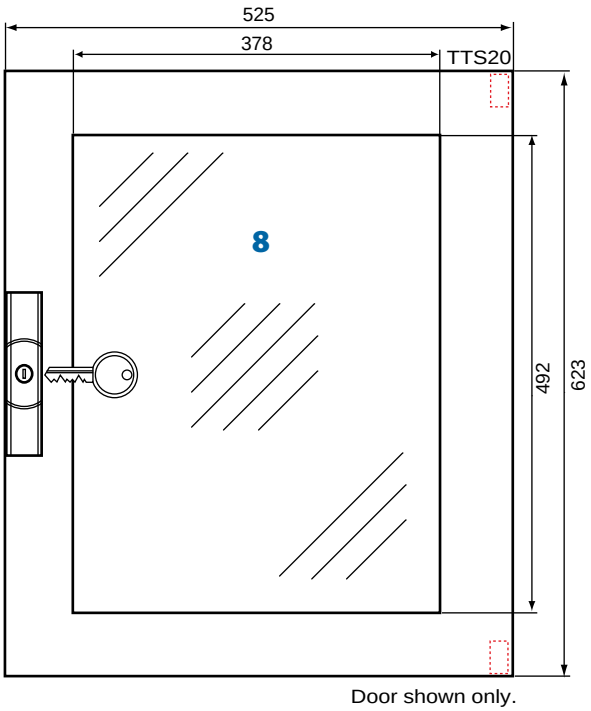
1 - Terminal area and equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internal power supply
4 - Current transformer for load monitoring
5 - 107TD47 insulation, load and temperature monitoring device
6 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
7 - IT system Subcircuits: 2-pole circuit-breakers (max. 12 breakers / IT system)
8 - Front door

S-IPS-RW(12) (flush/recessed mounted)









Dimensions:

- RW (12)
  - – flush/recessed mounted
    605 x 695 x 117 mm (+ 28 mm bezel)
  - – wall cut out
    560 x 684 x 120 mm

1 - Terminal area and equipotential bonding terminals

2 - Primary main isolator switch

3 - Circuit breaker for internal power supply

4 - Current transformer for load monitoring

5 - 107TD47 insulation, load and temperature monitoring device

6 - Power supply unit for alarm indicator and operator panels MK2430 / MK800

7 - IT system Subcircuits: 2-pole circuit-breakers (max. 12 breakers / IT system)

8 - Front door

IT system wall-mounted distribution boards Series…-IPS-W/EDS, -IPS-RW/EDS

for supplying power to medical locations in accordance with IEC 60364-7-710 and featuring a built-in insulation fault location system

S-IPS-W/EDS12

Device features

- Complete standardized IT system featuring
  - Insulation, load, temperature and connection monitoring
  - Main isolator switch
  - 6 subcircuits with 2-pole circuit-breakers / IT system (max. 12)
- Automatic insulation fault location system
- Power supply unit for alarm indicator and operator panels
- Time saving as the wall-mounted distribution boards are supplied prewired and factory tested
- Versions for 1…3 IT systems in one enclosure
- Designed in accordance with the requirements of applicable standards
- in and out going wires are terminated by screwless type/cage clamp spring terminals or as per customers specification
- Exchange of information via bus technology
- Short delivery times
- Surface wall-mounted and flush/recessed wall mounted for dry/cavity wall mounting

Application

The IT system distribution boards in the IPS series supply electrical power to group 2 medical locations.In such locations, according to the requirements of

- IEC 60364-7-710
  for circuits supplying medical electrical equipment and systems intended for life support, surgical applications and other electrical equipment located in the “patient environment“

the use of the IT system with insulation monitoring and load current monitoring (IEC 60364-7-710) is mandatory. This requirement applies for example for anaesthetic rooms, operating theatres, operating preparation rooms, operating plaster rooms, operating recovery rooms, heart catheterization rooms, intensive care rooms, angiographic examination rooms and premature baby rooms.

Furthermore, each IT system features a built-in insulation fault location system which is able to locate faulty subcircuits and/or socket outlets quickly and easily. This is a particular benefit in rooms featuring large numbers of socket outlets, e.g. intensive care units. The wall-mounted distribution board does not include isolating transformers. These are housed in a dedicated enclosure which is connected separately to the wall-mounted distribution board.

The distribution cabinet of the IPS-W series feature all necessary components and are supplied prewired to terminals, thereby drastically reducing the time needing to be spent on installation and commissioning. The completely factory tested cabinets do comply with our high quality and safety requirements and ISO9001 standard.

Insulation, load and temperature monitoring

The 107TD47 insulation monitoring device continuously monitors the insulation resistance, load current and the temperature of the IT system transformer. If one or a number of response values have been reached (insulation resistance, load current, temperature), the alarm relay will switch and a corresponding message will appear. The connecting cables to the system and PE, as well as to the measuring current transformer and temperature sensor, are permanently monitored. In the event of wire breakage or short circuit, of the current transformer an alarm will come on. The patented AMP measuring technique is used in order to exclude the possibility of insulation monitoring being impaired by DC components.

Insulation fault location system (EDS system)

In Group 2 medical locations featuring a large number of socket outlet circuits and/or loads (e.g. intensive care units), locating faulty circuits or loads can often be a time-consuming and difficult task for medical and technical personnel.The EDS insulation fault location system solves this problem by automatically locating the insulation fault during operation. This results in two decisive advantages:fault location and availability are optimized in terms of both time and cost, because the system remains in operation during automatic fault location.

How the EDS system works

The insulation fault location process starts when the A-ISOMETER® 107TD47 reports an insulation fault. The PGH474 test device generates a test current of max. 1 mA. This test current flows via the insulation fault location and via the earth wire (PE wire) back to the test device. The test current is detected by a measuring current transformer located on the fault path and processed by the EDS evaluator.

The location of the faulty circuit or load is identified by means of an assignment between the measuring current transformer/subcircuit and a unique text message, e.g. on a TM alarm indicator and operator panel, on the MK800 or the MK2430 alarm indicator and test combination.

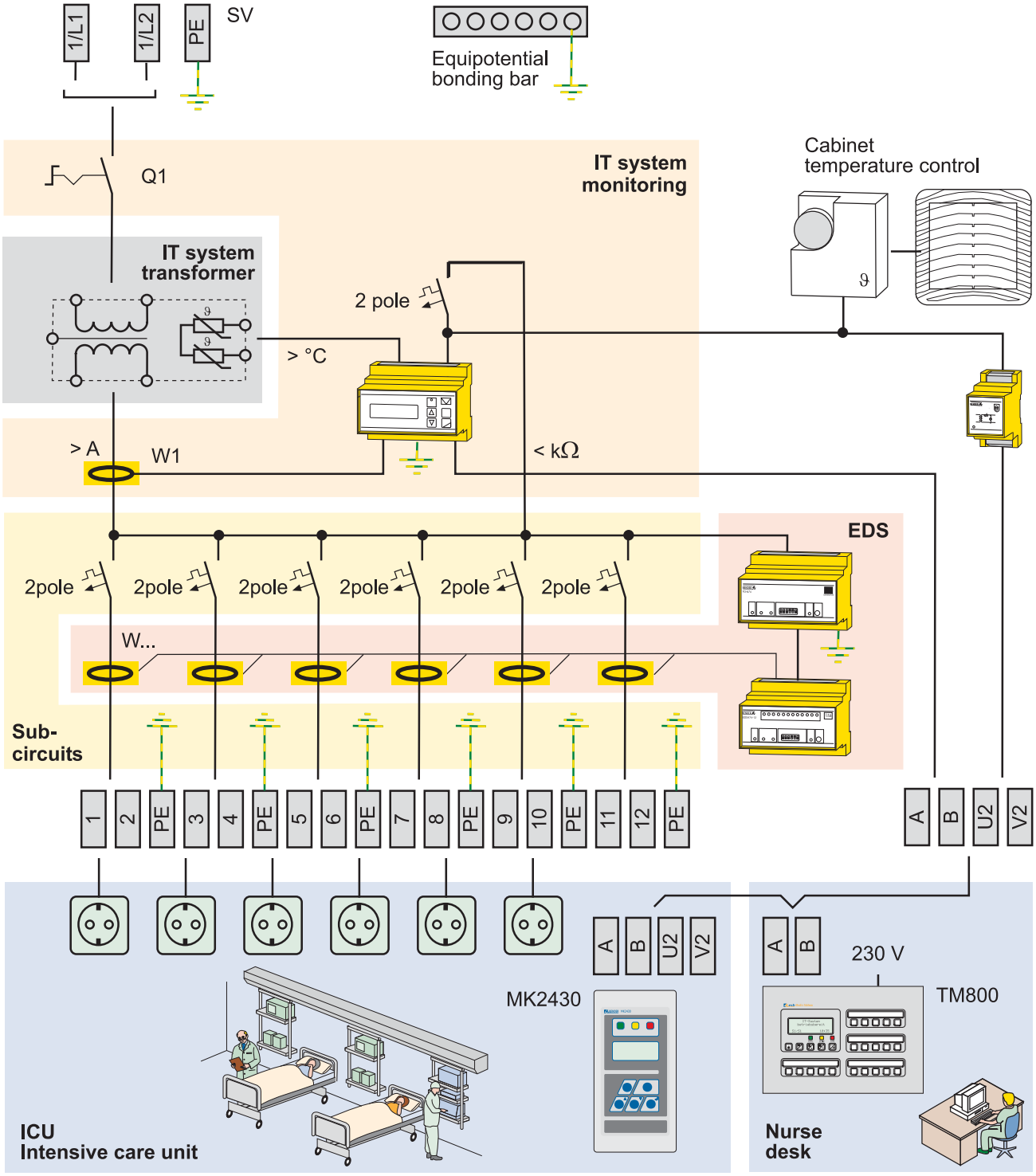
Messages displayed in plain text

The unique status, warning and fault messages are displayed in plain text.
The MK2430/MK800 alarm indicator and test combination or TM alarm indicator and operator panel must to be installed in a suitable location in the medical location and permanently monitored by medical staff. A twisted pair shielded bus cable is used to connect the IPS distribution cabinet to the alarm indicator panels.

Built-in components in accordance with IEC 60364-7-710

The IPS series distribution boards feature the following components per IT system:

- 107TD47 insulation, load and temperature monitoring device
- Main isolator switch
- typically 6 x 2-pole circuit-breakers
- 1 PGH474 insulation fault test device
- 1 EDS insulation fault evaluator
- EDS current transformers
- 1 Load current transformer
- 1 Equipotential bonding terminals
- Power supply unit for 2 x MK2430 or 1 MK800 alarm indicator and test combination(s)



Overview wiring diagram

Technical data wall-mounted distribution boards Series…-IPS-W/EDS, -IPS-RW/EDS

Distribution board data

Cabinet range	ABB / Striebel & John
Cabinet type	AT + U series, surface/flush/recessed mounted with door and inspection window
Degree of protection	IP43/31*
Protection class	isolated
Doors and walls	sheet steel 1.5…2 mm
Door	right-hinged
Door lock	lock with key
Paint finish	RAL 9016 (white)

Installation data

Type of installation	wall/dry/cavity wall mounting
Dimensions / Weight / Power consumption	see table

Type of wiring

Terminal area	at the top
Cable entry	via gland plates
Cable duct	none
Protective / neutral conductor	PE terminals, isolating terminals ≤ 10 mm²
Conductor colours	acc. to IEC 60446
Conductors	halogen-free

Connection type

Connection method	typically: screwless-type connection/ cage clamp spring terminals/or as specificated

Labeling

Devices	adhesive labels, IEC 61346-2
Distribution board	adhesive labels, black type on a white
Network type labelling	acc. to IEC

System data

Type of distribution system	IT system
Nominal voltage	AC 230 V / 50…60 Hz

Insulation monitoring

Adjustable response value R_{an1}	50 … 500 kΩ
Hysteresis	≤ 25 %
Response time t_{an} at $R_F = 0.5 \times R_{an}$ and $C_e = 1$ µF	≤ 3 s
Max. permissible system leakage capacitance	≤ 1 µF
Measuring voltage U_m	12 V
Measuring current I_m (at $R_F = 0$ Ω)	≤ 50 µA
Internal DC resistance R_i	≥ 240 kΩ
Impedance Z_i at 50 Hz	≥ 200 kΩ
Permissible external DC voltage U_{fg}	≤ DC 375 V

Overload monitoring

Adjustable response value	5 … 50 A
Hysteresis	4 %
Temperature influence	≤ 0.15 % / °C

Overtemperature monitoring

Response value	4 kΩ
Release value	1.6 kΩ
PTC resistors acc. to DIN 44081	max. 6 in series

Insulation fault location

Test current IT	≤ 1 mA
Test pulse/break	2 s / 4 s

Interfaces

Interface / protocol	RS-485 / BMS
Connection terminals	A/B
Max. cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE at one end)	J-Y(St)Y 2x0.8
Terminating resistor	120 Ω (0.25 W)

Switching elements (alarm contacts 107TD47)

Switching elements	1 changeover contacts
Operating principle, adjustable	N/C or N/O operation
Electrical endurance, number of cycles	12000
Rated contact voltage	AC 250 V/DC 300 V
Making capacity	AC/DC 5 A
Breaking capacity	2 A, AC 230 V, cos phi 0.4 0.2 A, DC 220 V, L/R = 0.04 s

General data

Ambient temperature (operation, in door use)	- 10 °C…+ 50 °C
Ambient temperature (storage)	- 40 °C…+ 70 °C
Operating mode	continuous operation

Product standards

Insulation monitoring	IEC 61557-82
Load and temperature monitoring	IEC 60364-7-710
Insulation fault location system	IEC 61557-9
Isolating transformer	IEC 60364-7-710 IEC 60558-1 IEC 61558-2-15

* with filter IP31

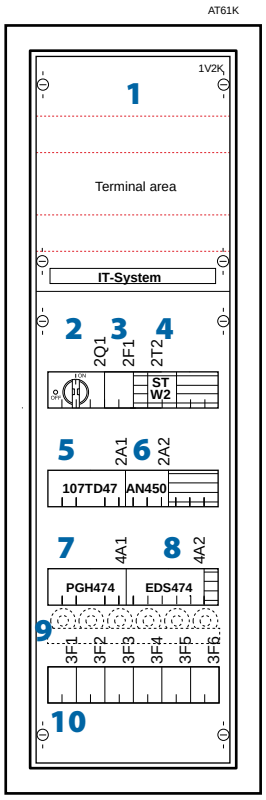
2.7

Overview / ordering information

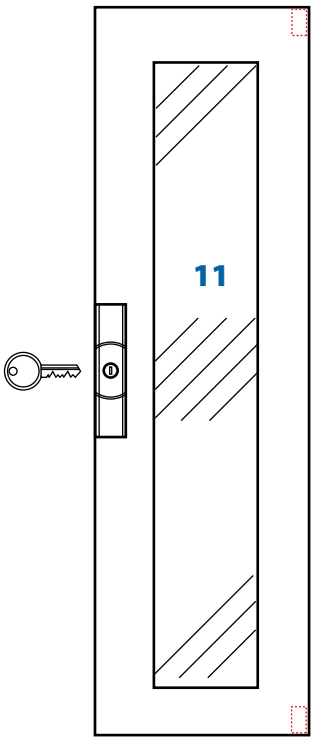
Type	Subcircuits (typically)	Quantity IT systems	Dimensions WxHxD (mm)	Weight (kg)
S-IPS-W/EDS	1 x 6	1	324 x 974 x 140	22
S-IPS-RW/EDS	1 x 6	1	355 x 995 x 117	22
S-IPS-W/EDS12	1 x 12	1	574 x 824 x 140	30
S-IPS-RW/EDS(12)	1 x 12	1	605 x 695 x 117	30
D-IPS-W/EDS	2 x 6	2	574 x 974 x 140	34

"-W" = surface wall mounted
"-RW" = flush/recessed wall mounted for dry/cavity wall mounting
28 mm bezel frame height

S-IPS-W/EDS (surface mounted)



refer to dwg #9800240



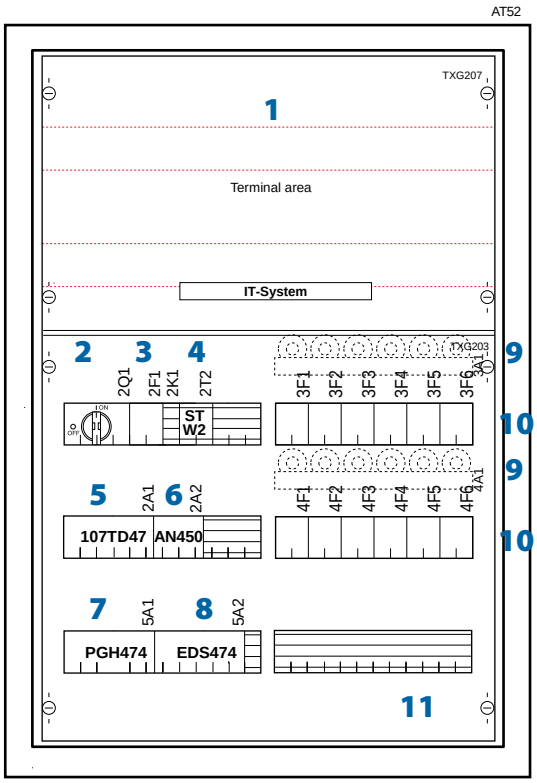
Frontview door, with window

Dimensions:

- W/EDS (dwg# 9800240)
  surface mounted
  324 x 974 x 140 mm (W x H x D)
- RW/EDS (dwg# 9800453)
  – bezel frame dimension
  355 x 995 x 117 (+28 mm bezel)
  – wall cut out
  310 x 984 x 120 mm

1 - Terminal area equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internal power supply
4 - Current transformer load monitoring
5 - 107TD47 insulation, load and temperature monitoring
6 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
7 - Insulation fault test device
8 - Insulation fault evaluator
9 - Measuring current transformer of EDS system
10 - IT system subcircuits: 2-pole circuit-breakers
11 - Front door

S-IPS-W/EDS (12) (surface mounted)



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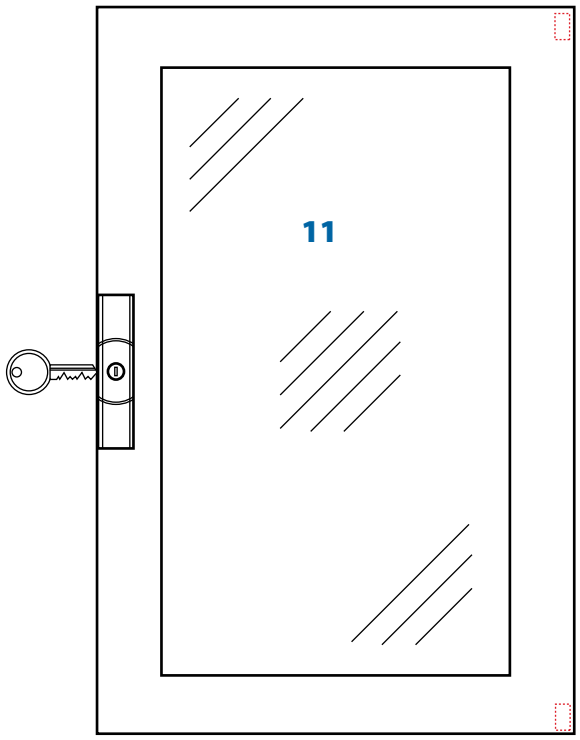


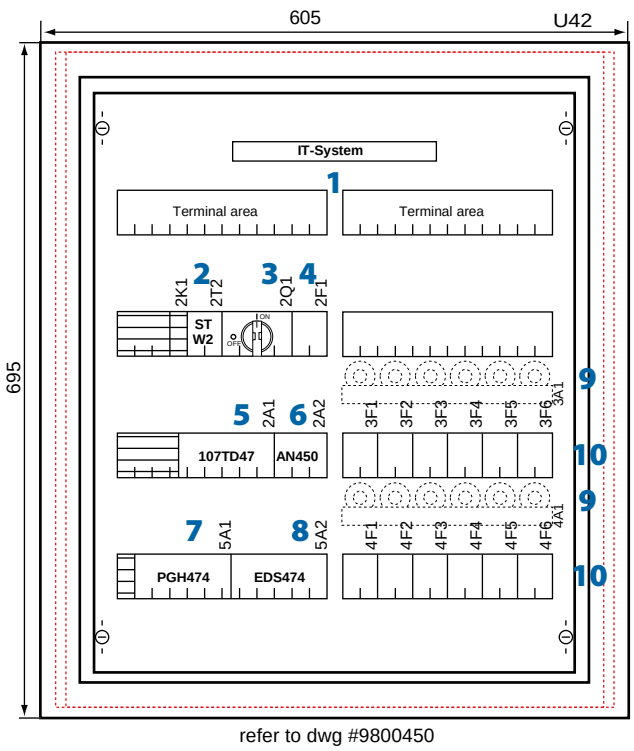
Frontview door, with window

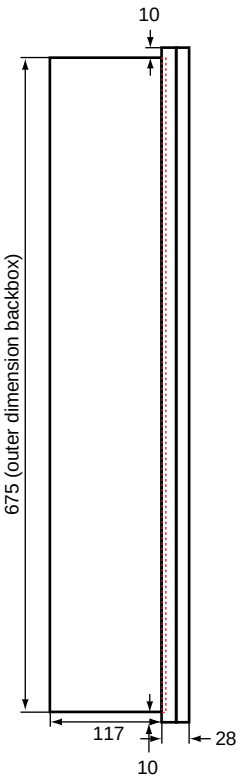
Dimensions:

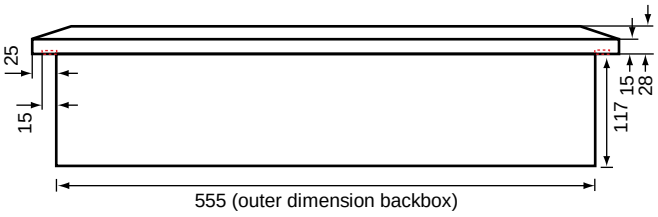
- W/EDS (dwg# 9800257)
  surface mounted
  574 x 824 x 140 mm (W x H x D)

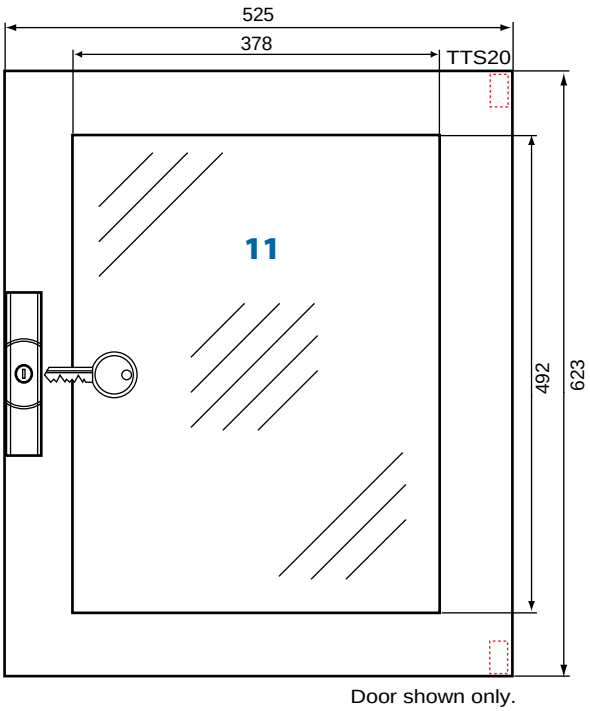
1 - Terminal area equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internal power supply
4 - Current transformer load monitoring
5 - 107TD47 insulation, load and temperature monitoring
6 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
7 - Insulation fault test device
8 - Insulation fault evaluator
9 - Measuring current transformer of EDS system
10 - IT system subcircuits: 2-pole circuit-breakers
11 - Front door

S-IPS-RW/EDS(12) (flush/recessed mounted)









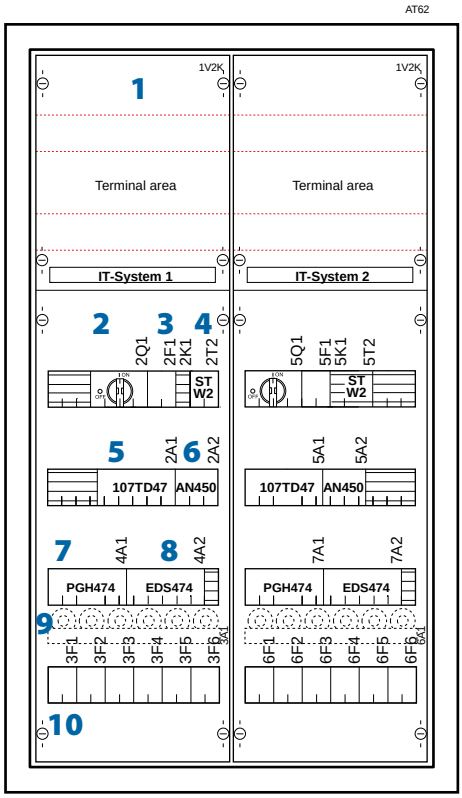
Dimensions:

- RW/EDS (12) (dwg# 9800450)
  - flush/recessed mounted
    605 x 695 x 117 mm (+ 28 mm bezel)
  - wall cut out
    560 x 684 x 120 mm

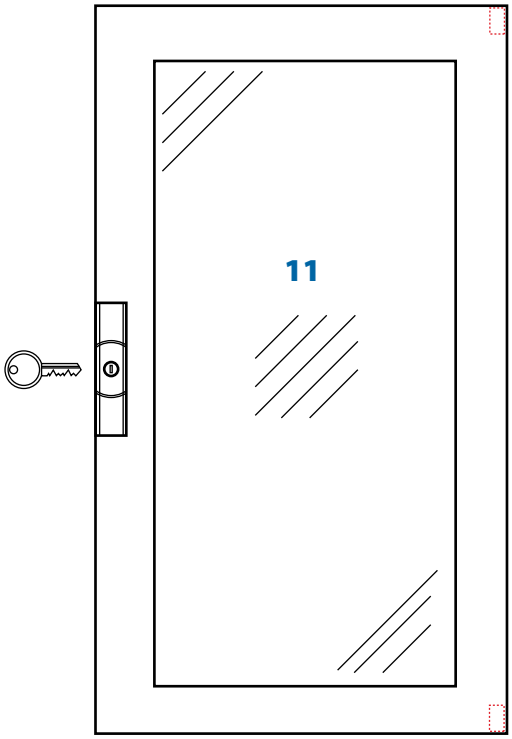
1 - Terminal area equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internal power supply
4 - Current transformer load monitoring
5 - 107TD47 insulation, load and temperature monitoring
6 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
7 - Insulation fault test device
8 - Insulation fault evaluator
9 - Measuring current transformer of EDS system
10 - IT system subcircuits: 2-pole circuit-breakers
11 - Front door

2.7

D-IPS-W/EDS (surface mounted)



refer to dwg #9800241



Frontview door, with window

Dimensions:

- W/EDS (dwg# 9800241)
  surface mounted
  574 x 974 x 140 mm (W x H x D)
- RW/EDS (dwg# 9800454)
  – bezel frame dimension
  605 x 995 x 117 (+ 28 mm bezel)
  – wall cut out
  560 x 984 x 120 mm

1 - Terminal area equipotential bonding terminals
2 - Primary main isolator switch
3 - Circuit breaker for internal power supply
4 - Current transformer load monitoring
5 - 107TD47 insulation, load and temperature monitoring
6 - Power supply unit for alarm indicator and operator panels MK2430 / MK800
7 - Insulation fault test device
8 - Insulation fault evaluator
9 - Measuring current transformer of EDS system
10 - IT system subcircuits: 2-pole circuit-breakers
11 - Front door

Annex

Applied standards and regulations

Device groups	International (IEC)	Europe (EN)	National (DIN VDE / DIN EN)	Others
Insulation monitoring devices and coupling devices (A-ISOMETERs and coupling devices)	IEC 61557-8:2007-01 IEC 61557-8:1997-02	EN 61557-8:2007-07	DIN EN 61557-8 (VDE 0413-8):2007-12	ASTM F 1207M-96(2002) (for AC) ASTM F 1669M-96(2002) (for AC, AC/DC, DC) ASTM F 1134-94(2002) (for offline monitors)
	EMC IEC 61326-1:2005-12 IEC 61326-2-4:2006-06	EN 61326-1:2006-10	DIN EN 61326-1 (VDE 0843-20-1):2006-10	
Insulation fault location systems (EDS)	IEC 61557-9:1999-09	EN 61557-9:1999-11	DIN EN 61557-9 (VDE 0413-9):2000-08	
	EMC IEC 61326-1:2005-12 IEC 61326-2-4:2006-06	EN 61326-1:2006	DIN EN 61326-1 (VDE 0843-20-1):2006-10	
Residual current monitors and residual current monitoring systems (RCM, RCMS, RCMA)	IEC 62020:2003-11 based on IEC 60947-2:2006-05	EN 62020:2005-11	DIN EN 62020 (VDE0663):2005-11	
Measuring and monitoring relays	IEC 60255-6:1988-12 based on IEC 61010-1:2001-02	EN 60255-6:1994-05 based on EN 61010-1:2001-03	DIN EN 60255-6 (VDE 0435-301):1994-11 based on DIN EN 61010-1 (VDE 0411-1):2002-08	
	EMC IEC 61326-1:2005-12	EN 61326-1:2006	DIN EN 61326-1 (VDE 0843-20-1):2006-10	
Power supply units, energy storage devices, communication devices (FTCs) and the like, alarm indicator and test combinations (MKs), operator panels	IEC 61010-1:2001-02	EN 61010-1:2001-03	DIN EN 61010-1 (VDE 0411-1):2002-08	
	EMC IEC 61326-1:2005-12	EN 61326-1:2006	DIN EN 61326-1 (VDE 0843-20-1):2006-10	
Applies to all devices:				
Insulation coordination	IEC 60664-1:2007-04 IEC 60664-3:2003-02	EN 60664-1:2007-08 EN 60664-3:2003-04	DIN EN 60664-1 (VDE 0110-1):2008-01 DIN EN 60664-3 (VDE 0110-3):2003-09	
Climatic categories	IEC 60721-3-1:1997-02 IEC 60721-3-2:1997-03 IEC 60721-3-3:2002-10	EN 60721-3-1:1997-03 EN 60721-3-2:1997-03 EN 60721-3-3:1995-01 and EN 60721-3-3 / A2:1997-01	DIN EN 60721-3-1:1998-03 DIN EN 60721-3-2:1998-03 DIN EN 60721-3-3:1995-09 and DIN EN 60721-3-3/A2:1997-07	
Mechanical stress	IEC 60721-3-1:1997-02 IEC 60721-3-2:1997-03 IEC 60721-3-3:2002-10	EN 60721-3-1:1997-03 EN 60721-3-2:1997-03 EN 60721-3-3:1995-01 and EN 60721-3-3 / A2:1997-01	DIN EN 60721-3-1:1998-03 DIN EN 60721-3-2:1998-03 DIN EN 60721-3-3:1995-09 and DIN EN 60721-3-3/A2:1997-07	
Degree of protection	IEC 60529:2001-02	EN 60529:1991-10 and EN 60529/A1:2000-02	DIN EN 60529 (VDE 0470-1):2000-09	

The edition of the standards listed above corresponds to the catalogue's latest date of issue.

Applied standards

IEC 60364-5-52:1993
Erection of low voltage installations – Part 5: Selection and erection of electrical equipment – Chapter 52: Wiring systems

DIN VDE 0100-520 (VDE 0100-520):2003-06
Errichten von Niederspannungsanlagen – Teil 5: Auswahl und Errichtung von elektrischen Betriebsmitteln – Kapitel 52: Kabel- und Leitungsanlagen

IEC 60439-1:2004-04
Low-voltage switchgear and controlgear assemblies – Part 1: Type-tested and partially type-tested assemblies

DIN EN 60439-1 (VDE 0660-500):2005-01
Niederspannungs-Schaltgerätekombinationen – Teil 1: Typgeprüfte und partiell typgeprüfte Kombinationen

IEC 60947-6-1:2005-08
Low-voltage switchgear and control gear – Part 6-1: Multiple function equipment – Transfer switching equipment

DIN EN 60947-6-1 (VDE 0660-114):2006-07
Niederspannungsschaltgeräte – Teil 6-1: Mehrfunktionsschaltgeräte - Netzumschalter

IEC 61557-8:2007-01
Electrical safety in low voltage distribution systems up to 1000 V a.c. and 1500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 8: Insulation monitoring devices for IT systems

DIN EN 61557-8 (VDE 0413-8): 2007-12
Elektrische Sicherheit in Niederspannungsnetzen bis AC 1000 V und DC 1500 V – Geräte zum Prüfen, Messen oder Überwachen von Schutzmaßnahmen – Teil 8: Isolationsüberwachungsgeräte für IT-Netze

IEC 61557-9:1999-09
Electrical safety in low voltage distribution systems up to 1000 V a.c. and 1500 d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 9: Equipment for insulation fault location in IT systems

DIN EN 61557-9 (VDE 0413-9):2000-08
Elektrische Sicherheit in Niederspannungsnetzen bis AC 1 kV und DC 1,5 kV – Geräte zum Prüfen, Messen oder Überwachen von Schutzmaßnahmen – Teil 9: Einrichtungen zur Isolationsfehlersuche in IT-Systemen

IEC 61558-1:2005-09
Safety of power transformers, power supplies, reactors and similar products – Part 1: General requirements and tests

DIN EN 61558-1 (VDE 0570-1):2006-07
Sicherheit von Transformatoren, Netzgeräten, Drosseln und dergleichen – Teil 1: Allgemeine Anforderungen und Prüfungen

IEC 61558-2-6:1997-02
Safety of power transformers, power supply units and similar – Part 2: Particular requirements for safety isolating transformers for general use

DIN EN 61558-2-6 (VDE 0750-2-6):1997
Sicherheit von Transformatoren, Netzgeräten und dergleichen – Teil 2-6: Besondere Anforderungen an Sicherheitstransformatoren für allgemeine Anwendungen

IEC 61558-2-15:1999-02
Safety of power transformers, power supply units and similar – Part 2-15: Particular requirements for isolating transformers for the supply of medical locations

DIN EN 61558-2-15 (VDE 0570-2-15): 2001
Sicherheit von Transformatoren, Netzgeräten und dergleichen – Teil 2-15: Besondere Anforderungen an Trenntransformatoren zur Versorgung medizinischer Räume

Standards and devices – Table of assignments

	USC710D4 USC710D4-HA	UMC108E	UFC107E	UMC107E	LITC107E LITC107D	LFC107E	ES710	ESL0107
IEC 60364-5-52 DIN VDE 0100-520 (VDE 0100-520) + Beiblatt 1, 2	×	×	×	×				
IEC 60364-7-710 DIN VDE 0100-710 (VDE 0100-710)	×		×	×	×	×	×	
IEC 60439-1 DIN EN 60439-1 (VDE 0660-500) + Beiblatt 2	×	×	×	×				
IEC 60947-6-1 DIN EN 60947-6-1 (VDE 0660-114)	×	×	×	×				
IEC 61557-8 DIN EN 61557-8 (VDE 0413-8)	(×)		×	×	×	×		
IEC 61557-9 DIN EN 61557-9 (VDE 0413-9)			×			×		
IEC 61558-1 DIN EN 61558-1 (VDE 0570-1)							×	×
IEC 61558-2-6 DIN EN 61558-2-6 (VDE 0570-2-6)								×
IEC 61558-2-15 DIN EN 61558-2-15 (VDE 0570-2-15)							×	

Annex

Service and project planning

Service & Support

Planning & Concept

From support to customised solutions

- Detailed as-is analysis
- Technical support for products and systems
- Application assistance
- Seminars, training and presentations

Selection of Devices & Project Scheduling

From the selection of the device to project scheduling

- Selection of the appropriate components and systems
- Working out a detailed solution
- Assistance in tender invitations and project awarding

Commissioning

From installation to final inspection

- Installation check
- Parameter settings and adjustments
- Test run and final inspection
- Operator instruction/ training

Operation & Maintenance

From maintenance to repair

- Repairs / troubleshooting
- Maintenance, repairs, spare parts
- Maintenance / repair works

Expansion & Modernization

From expansion to modernization

- Technical advice on the improvement and modernisation
- Planning and implementation of retrofitting
- Optimization of installations and installation sections

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- When safety is concerned in project planning
- Optimum assistance facilitates implementation
- High plant availability and productivity

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The Power in Electrical Safety

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